# Standards, Methodologies and Performance Measures

# Workgroup Meeting

October 25, 2021; 9AM – 12PM

# Welcome!!

We are looking forward to a productive meeting, please consider -

- **Remote meeting.** Remote collaboration meetings can be challenging and frustrating, especially with larger groups – please be patient and flexible.
- **Participation:**
  - **Chat Panel** will be used by *workgroup members to provide comments and ask questions.*
  - **Q&A Panel** can be used by *attendees to provide additional input and will be addressed as time permits.*
  - **Hand raise in participant panel** can be used to *ask questions and participate in discussion.*

# Workshop Agenda

Meeting Objectives: Provide an update on the proposed recommendations for:

(1) Outdoor residential water use standard

(2) Commercial, Industrial, and Institutional (CII) outdoor landscape area with dedicated irrigation meters (DIM) standard.

| | |
|---|---|
| **10:00** | **Welcome and Introductions**<br>*Deputy Director Kris Tjernell, DWR*<br>*Orit Kalman, Sac State – Consensus and Collaboration Program* |
| **9:15** | **Outdoor Residential Water Use Standard Recommendations**<br>*Bekele Temesgen, Manager, DWR Land and Water Use Section*<br>*Anil Bamezai, Principal, Western Policy Research*<br>• Background and Legislative directive<br>• Update on the provisional outdoor water use standard recommendations – Presentation and Q&A |
| **10:25** | **Short Break** |
| **10:35** | **CII Outdoor Landscape Area with DIM Standard Recommendations**<br>*Sabrina Cook, Manager, Water Use Efficiency Implementation Section*<br>*Shem Stygar, Sr. Water Resources Engineer*<br>• Background and Legislative directive<br>• Recommendations on thresholds for converting mixed CII meters to DIM and technologies that could be used in lieu of requiring dedicated irrigation meters – Presentation and Q&A<br>• Development of the CII outdoor standard - Presentation and Q&A |
| **11:45** | **Capping Consideration for Total Water Use Reductions**<br>*Bekele Temesgen, Manager, DWR Land and Water Use Section* |
| **11:55** | **Next Steps** |
| **12:00** | **Adjourn** |

CALIFORNIA DEPARTMENT OF WATER RESOURCES

# Welcome and Introductions

*Deputy Director Kris Tjernell, DWR*

CALIFORNIA DEPARTMENT OF WATER RESOURCES

# Outdoor Residential Water Use Standard Recommendations

## - Overview of Legislative Background and Approach

**Bekele Temesgen**, Manager
Land and Water Use Section, California Department of Water Resources

# Workgroups to Assist DWR in Implementing 2018 Legislation

***For Efficient Urban Water Use Standards (multiple products)***

Landscape Area Measurement (LAM) Workgroup

Water Use Studies (WUS) Workgroup

Standards, Methodologies and Performance Measures (SMPM) Workgroup



***Others (mostly single product)***

- County Drought Advisory Group
- Wholesale Water Loss
- MWELO Guidebook
- UWMP Guidebook
- AWMP Guidebook
- Annual Water Supply and Demand Assessment
- Report Streamlining (TBD)

# Workgroups Membership

Alameda County Water District

Arcadis

Association of California Water Agencies

Bay Area Water Supply and Conservation Agency

California American Water

California Water Service

Camrosa Water District

City of Glendale

City of Lakewood

City of Petaluma

City of Pleasanton

City of Sacramento

City of Santa Monica

Coachella Valley Water District

Contra Costa Water District

County of Napa

Delta Stewardship Council

East Bay Municipal Utility District

Eastern Municipal Water District

Ecolab

Gardenworks Inc.

Irvine Ranch Water District

Kennedy Jenks Consultants

Los Angeles Department of Water and Power

Long Beach Water Department

Mesa Water District

Metropolitan Water District

Mission Springs Water District

Municipal Water District of Orange County

Natural Resources Defense Council

Olivenhain Municipal Water District

Pacific Institute

Plumbing Manufacturers International

Rancho California Water District

Regional Water Authority

Sacramento Suburban Water District

San Diego County Water Authority

San Francisco Public Utilities Commission

San Jose Water

Santa Clara Valley Water

SCV Water District, Pajaro River Watershed

South Tahoe Public Utility District

Stanford University

Valley County Water District

Walnut Valley Water District

Water Systems Optimization

WateReuse CA

WaterNow Alliance

West Yost Associates

Western Municipal Water

# Technical Consultants

Western Policy Research

**Anil Bamezai** – Statistician, consultant to DWR for sampling and validation studies


David Mitchell
General Partner/ Economist

**Quantum Spatial, Inc.** – Principal contractor; project management, classification model development, validation and application, provide deliverables to DWR.

FORMATION ENVIRONMENTAL

**Formation Environmental** – Provide independent validation studies and technical support to DWR.

**Eagle Aerial Solutions** – Subcontractor to QSI; procure project aerial imagery and standardized assessor parcel data, develop and host web portal for data review

# Workgroup and Stakeholder Meetings

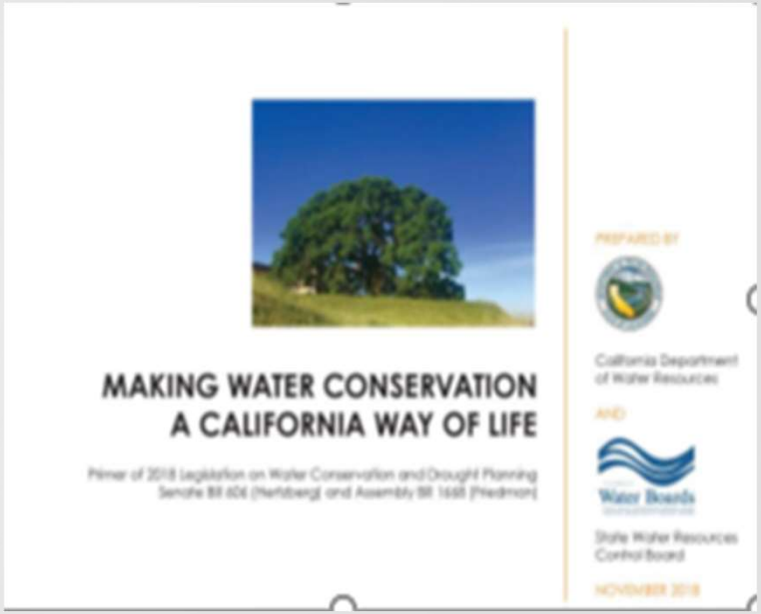
October 28, 2020 – stakeholder meeting
February 24, 2021 – stakeholder meeting
June 30, 2021 – stakeholder meeting
August 25, 2021 – stakeholder meeting
October 25, 2021 – stakeholder meeting
November 16, 2021 – stakeholder meeting

To access audio records and documents, please visit:
https://cawater.sharepoint.com/sites/dwr-wusw/SitePages/Standards,-Methodologies-and-Performance-Measures.aspx

# The Legislation (AB 1668 and SB 606)

**California Water Code Section 10609.6.** (a) (1) The department, in coordination with the board, shall conduct necessary studies and investigations and recommend, no later than October 1, 2021, standards for outdoor residential use for adoption by the board in accordance with this chapter.

(2) (A) The standards shall incorporate the principles of the model water efficient landscape ordinance adopted by the department pursuant to the Water Conservation in Landscaping Act (Article 10.8 (commencing with Section 65591) of Chapter 3 of Division 1 of Title 7 of the Government Code).



# Principles of Model Water Efficient Landscape Ordinance (MWELO)

MAWA = (ETo – Peff) * (0.62) * ETAF * LA

Where MAWA = Maximum Applied Water Allowance (gallons)
LA = Parcel landscape area (sq.ft)
ETo = reference evapotranspiration (in)
Peff = Effective precipitation (in)
ETAF = Evapotranspiration Adjustment Factor (unitless)

MAWA is applied at the parcel level

# Application of MWELO Principles to Outdoor Water Use Standard

$$ORWU = (ETo - Peff) * (0.62) * (ETF) * (LAs)$$

Where ORWU = Outdoor Residential Water Use (gallons)
ETo = Reference evapotranspiration (inches)
Peff = Effective precipitation (inches)
ETF = Supplier level ET factor (unitless)
LAs = Landscape area for a water supplier (sq. ft)
0.62 = unit conversion factor

ORWU is applied at the supplier level

# Data Sources for Setting Outdoor Standard

| Data | Source | Years |
|---|---|---|
| Outdoor Residential Water Use (ORWU) | Water Resources Control Board, eAR | 2017, 2018, 2019 |
| Reference Evapotranspiration (ETo) | Department of Water Resources, California Irrigation Management Information System (CIMIS) | 2017, 2018, 2019 |
| Effective Precipitation (Peff) | Department of Water Resources, Cal-SIMETAW Model | 2017, 2018, 2019 |
| Supplier Landscape Area (LAs) | Department of Water Resources, Landscape Area Measurement (LAM) | 2016, 2018 |

# Supplier Landscape Area

- **California Water Code 10609.6. (b)** The department shall, by **January 1, 2021**, provide each urban retail water supplier with data regarding the area of residential irrigable lands in a manner that can reasonably be applied to the standards adopted pursuant to this section.
- DWR classified residential single family and multi-family landscapes into three classes based on irrigation status. The three classes are:
  - Irrigable-Irrigated (II)
  - Irrigable-Not-Irrigated (INI)
  - Not-Irrigable (NI)
- Object-based landscape classifications were aggregated at a parcel and service area level for delivery to suppliers

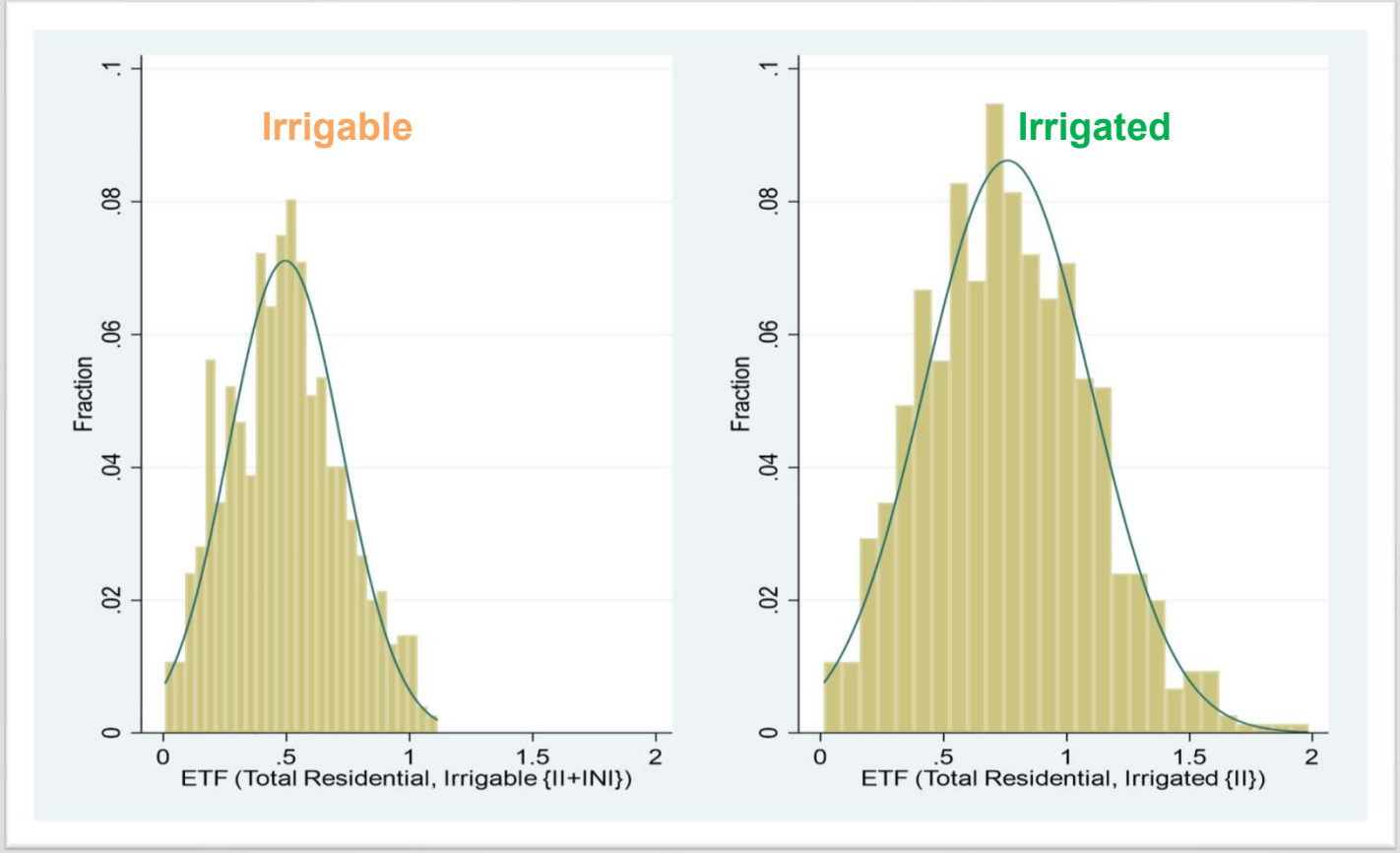
# Calculating ETF for each Supplier

Rearranging the previous equation:

$$ETF = \frac{ORWU}{(ETo - Peff) * LAs * 0.62}$$

Which area do we use in this equation? II or II+INI?

# Distributions of ETF



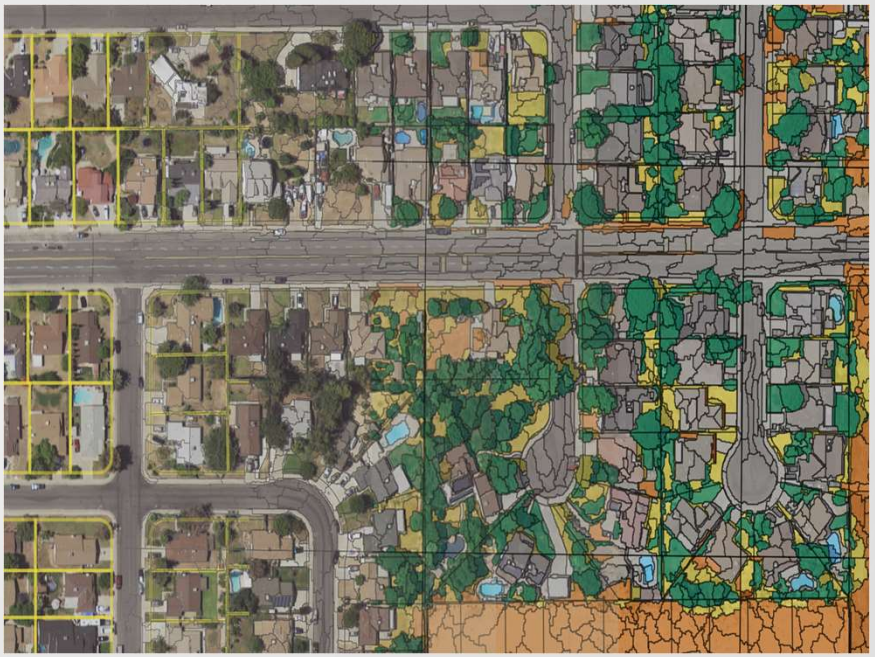

CALIFORNIA DEPARTMENT OF
WATER RESOURCES

# Considerations for Setting the Standard

- Is it possible that some of the INI landscape areas may have received irrigation water during the year?
- Where are we now in water use efficiency?
- What is achievable?
- What does horticultural and irrigation science tell us?

# Proposed Provisional Standard

- Proposed provisional outdoor residential water use standard = **0.7**
- Outdoor residential water use standard for new developments = **0.55**, or the current MWELO ETAF value for residential homes
- Irrigable landscape area to which the standards apply = **II + 0.20*INI**
- **0.20*INI** is the buffer, our best estimate of the proportion of INI that may have received irrigation sometime during the year



# Provisional Outdoor (cont.)

- The proposed outdoor standard was presented as provisional for the following reasons:
  - ✓ The landscape area measurement data was not final
  - ✓ Stakeholder input was not fully considered
  - ✓ Comparison between the objective based total water use and SB X7-7 2020 targets had not been conducted as directed by the legislation
  - ✓ DWR executives have not approved the proposed standard

# LAM Project Status Update

- Provisional landscape area measurement data was delivered to retail water suppliers
- Suppliers were asked to review their respective LAM data and provide feedback
- DWR received feedback from 56% of retail water suppliers.
- Currently, landscape area for 395 of the 398 retail water suppliers have been finalized and will be delivered over the next couple of weeks
- DWR will continue working with suppliers that may discover significant issues in their LAM data
- DWR re-summarized the data using the latest delivery

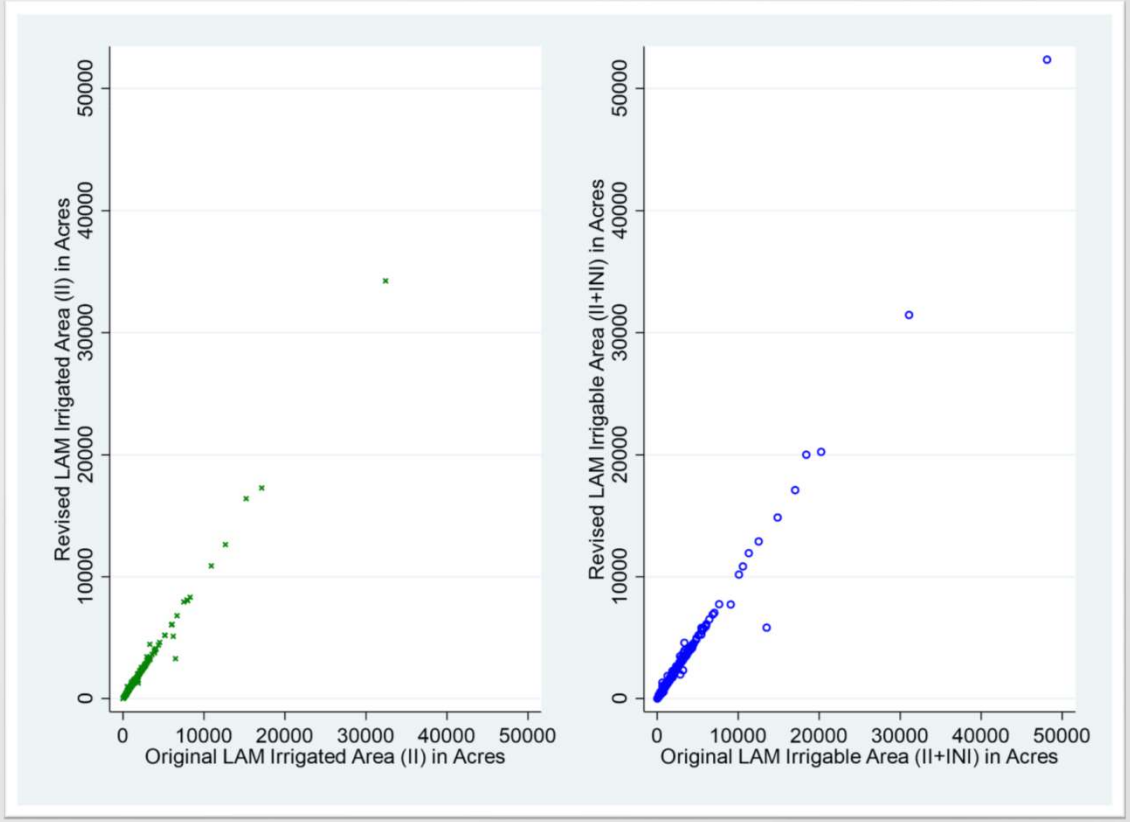
CALIFORNIA DEPARTMENT OF WATER RESOURCES

# Update on the Provisional Outdoor Water Use Standard Recommendations

**Anil Bamezai**, Principal, Western Policy Research

# Impact of LAM Data Revisions

- Chart shows comparison across 396 Urban Water Suppliers
- Latest and original irrigated (II) and irrigable (II+INI) area estimates are highly correlated (>0.99)



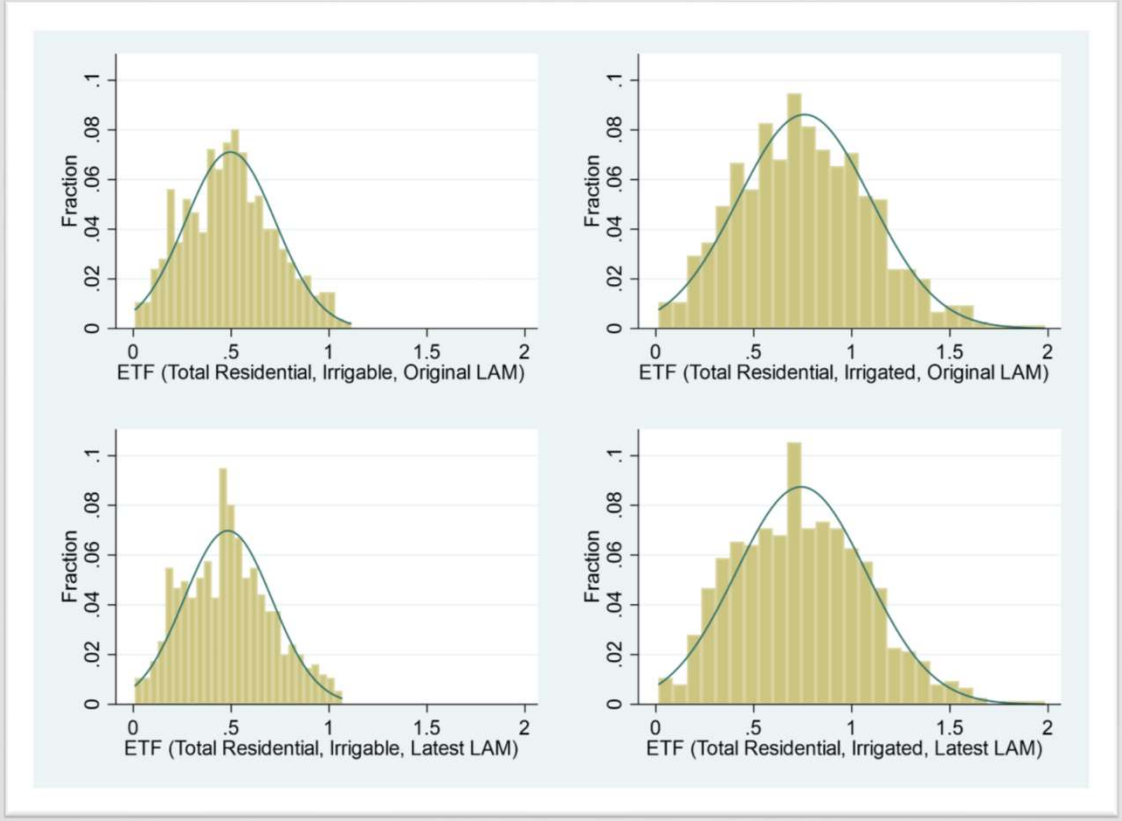

CALIFORNIA DEPARTMENT OF
WATER RESOURCES

# Revised LAM Estimates are Slightly Higher

- Both median and mean area have increased slightly across 396 Urban Water Suppliers
- Distribution of irrigated and irrigable areas across suppliers has shifted a bit to the right

| | % Change in Revised LAM Data Relative to Original LAM Data | |
|---|---|---|
| | **Median** | **Mean** |
| Irrigated (II) Area | 2.9% | 1.8% |
| Irrigable (II +INI) Area | 3.5% | 1.6% |

# Impact of Revised LAM on ETFs



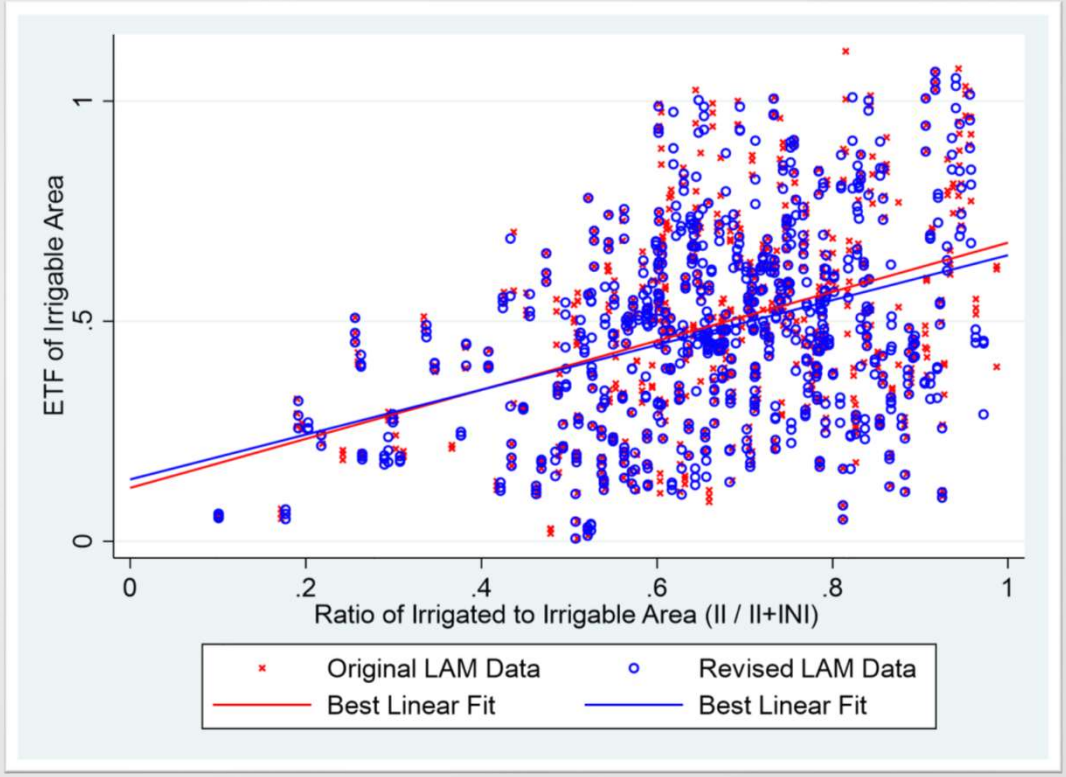
# Mean ETF Estimates Decline Slightly

- Higher revised LAM estimates causes ETF estimates to decline
- The impact is relatively minor
- Based on a climatically representative subset of 249 water suppliers with available residential outdoor water use estimates

| | Original LAM Data (Mean ETF) | Revised LAM Data (Mean ETF) |
|---|---|---|
| ETF Irrigated (II) | 0.76 | 0.74 |
| ETF Irrigable (II+INI) | 0.50 | 0.48 |

# Buffer Policy Not Significantly Impacted

- Original fitted line, cut point of left Y-axis=0.12, right Y-axis=0.68
- Revised fitted line, cut point of left Y-axis=0.14; right Y-axis=0.65
- Proposed buffer policy of 20% consistent with original and revised LAM data



# Stakeholder Feedback on Provisional Outdoor Standard

- The proposed provisional outdoor residential standard is too low and not feasible
  - ✓ Water suppliers do not have the authority to force residential customers to reduce outdoor water use to the proposed level
  - ✓ Irrigation efficiency of 0.80 is too high and does not reflect reality on the ground
  - ✓ Accuracy of eAR and LAs is questionable and can result in multiple sources of error
  - ✓ The process is based on design standards, not real-world performances
  - ✓ Stakeholder proposed standard: 1.0 and 0.8

- The proposed provisional outdoor standard needs to ramp down over time
  - ✓ Due to climate change, California is experiencing more frequent and severe drought than ever before
  - ✓ Climate change is reducing runoff due to increased evaporative losses
  - ✓ Therefore, the standard needs to be ramped down over time
  - ✓ Ramp down ETF to 0.55 by 2030

# Outdoor Residential Water Use Exceedance

## Indoor Standard = 55 gpcd & Outdoor Standard = 0.70

| Parameter | Exceedance (%)[1] | | | | |
|---|---|---|---|---|---|
| | 0 | 0 - 10 | 10 - 20 | 20 - 30 | >30 |
| Frequency[2] | 232 | 29 | 28 | 28 | 81 |
| Proportion (%)[3] | 58.0 | 7.0 | 7.0 | 7.0 | 20.0 |
| Mean Exceedance (%)[4] | 0.0 | 4.8 | 14.8 | 25.5 | 70.7 |

[1]Exceedance – the percentage by which actual water use exceeds efficient outdoor water use

[2]Frequency – number of suppliers in each bin

[3]Proportion – ratio of frequency to the total number of suppliers (398)

[4]Mean Exceedance – the average of all exceedances in each bin

# Outdoor Residential Water Use Exceedance

## Indoor Standard = 55 gpcd & Outdoor Standard = 0.80

| Parameter | Exceedance (%)[1] | | | | |
|---|---|---|---|---|---|
| | 0 | 0 - 10 | 10 - 20 | 20 - 30 | >30 |
| Frequency[2] | 272 | 33 | 29 | 22 | 42 |
| Proportion (%)[3] | 68.0 | 8.0 | 7.0 | 6.0 | 11.0 |
| Mean Exceedance (%)[4] | 0.0 | 5.0 | 15.1 | 25.5 | 74.9 |

[1]Exceedance – the percentage by which actual water use exceeds efficient outdoor water use

[2]Frequency – number of suppliers in each bin

[3]Proportion – ratio of frequency to the total number of retail water suppliers (398)

[4]Mean Exceedance – the average of all exceedances in each bin

# Policy Considerations - Phase-In Approach

- Based on stakeholder feedback, DWR is proposing a phase-in approach
- Start with an outdoor residential water use standard of **0.80**
  - ✓ Good indicator of current statewide outdoor water use efficiency
  - ✓ Same as MWELO's ETAF for existing non-rehabilitated landscape
  - ✓ Consistent with average ETF calculated from housing stock analysis based on MWELO's ETAF numbers
- Phase-in to an outdoor residential water use standard of **0.65** by 2030
  - ✓ This is consistent with the average ETF for efficient water suppliers
  - ✓ Achievable because nearly 50% of the 249 sample suppliers are already at or below ETF of 0.65
- Outdoor residential water use standard for new developments = **0.55**, or current MWELO ETAF value

# Efficient Outdoor Residential Water Use (EORWU) Calculation

- **2023 through 2029**

  EORWU = (ETo – Peff) * (0.62) * (0.80) * (II + 0.20*INI) + {EORWU-new}

- **2030 and beyond**

  EORWU = (ETo – Peff) * (0.62) * (0.65) * (II + 0.20*INI) + {EORWU-new}

New Developments

- Suppliers can use ETo, Peff, II, and INI data provided by DWR, or an alternative data, by demonstrating to DWR that their data is as accurate as, or more accurate than, the data provided by the Department

# Provisional Outdoor Water Use Standard Recommendations
# Q&A

**Workgroup members**:

- Please use the **'handraise' function** (located in the participants panel) to get into a queue or use the **Chat panel** to write in questions and comments.

**Members of the public:**

- Please use the **Q&A Panel** to ask questions and provide comments.


Short Stretch Break

CALIFORNIA DEPARTMENT OF WATER RESOURCES

# CII Outdoor Landscape Area with DIM Standard Recommendations

- Background and Legislative directive
- Recommendations on thresholds for converting mixed CII meters to DIM and technologies that could be used in lieu of requiring dedicated irrigation meters – Presentation and Q&A
- Development of the CII outdoor standard - Presentation and Q&A

**Sabrina Cook,** Water Use Efficiency Implementation Section Manager
**Shem Stygar**, Senior Water Resources Engineer, Land and Water Use Section

# Technical Consultants

Stantec

**Yung-Hsin Sun**
Vice President/
Water Resource Engineer

M.CUBED
POLICY ANALYSIS FOR THE PUBLIC AND PRIVATE SECTORS

**David Mitchell**
General Partner/ Economist

WESTERN POLICY RESEARCH

**Anil Bamezai**
Statistician

# CII-Dedicated Irrigation Meters (CII-DIM) Standard

**CII-DIM Standard**: California Water Code (WC) Section 10609.8(a) requires that the department conduct necessary studies and investigations and recommend standards for outdoor irrigation of landscape areas with dedicated irrigation meters or other means of calculating outdoor irrigation use in connection with CII water use for adoption by the State Water Board:

- WC 10609.8(b) The standards shall incorporate the principles of the model water efficient landscape ordinance.
- WC 10609.8(c) Excludes commercial agriculture

This standard becomes part of water supplier's Urban Water Use Objective (UWUO):

- WC Section 10609.20 (c)(3) – "Aggregate estimated efficient outdoor irrigation of CII Landscape Areas"

# Equivalent Technology

WC 10609.20(c)(3): *Aggregate estimated efficient outdoor irrigation of landscape areas with dedicated irrigation meters* ***or equivalent technology*** *in connection with CII water use (as part of UWUO)*

In calculating the UWUO, water suppliers must include the estimated efficient irrigation with CII-DIMs or equivalent technology:

- Equivalent technology is undefined in WC.
- WC 10609.20(c)(3) and 10608.8(a) suggest that an equivalent technology is required to be functionally equivalent to a DIM for CII landscape water use

# Related CII Performance Measure/BMP

WC 10609.10(b)(2) *"Recommendations for setting minimum size thresholds for converting mixed CII meters to dedicated irrigation meters, and evaluation of, and recommendations for, technologies that could be used* ***in lieu of requiring*** *dedicated irrigation meters."*

This means if irrigated landscape exceeds the threshold:

1. Convert to a CII-DIM or equivalent technology
2. If not converting to a CII-DIM, in-lieu technologies can be used instead of installing a CII-DIM or equivalent technology

# What This Related CII Performance Measure/BMP Means

- If a mixed-use meter (MUM) is converted to a DIM (or equivalent technology), that irrigated landscape area water use is now subject to the CII-DIM Standard

  WC 10609.20(c), efficient water use volumes per **CII-DIM Standard or equivalent technology** are required to be included in the calculation of individual urban retail water supplier's UWUO

- Existing law does not require reporting of efficient water use volumes for CII landscape using in-lieu technologies in the calculation of the UWUO for individual urban retail water supplier.

# The Proposed CII-LAM Pilot Study Is Not Pursued

**Proposed Study Concept:** Pilot CII landscape area measurement (LAM) of up to 50 water supplier service areas was considered to:

- Inform the distribution of CII landscape sizes for recommending threshold
- Inform what is existing water use on CII irrigated landscapes Statewide
- Couple supplier DIM landscape area measurement and water use data with CII-LAM data to validate the CII-LAM data and estimate existing CII landscape water use efficiency

# The Proposed CII-LAM Pilot Study Is Not Pursued

**Reasons for not pursing the proposed study:**

- **Time constraints:** About 1 year to complete CII-LAM pilot study for a subset of water suppliers and additional time is required for validation with water suppliers
- **Technical limitations:** CII-DIMs would need to be associated with known irrigated landscape areas, which would only capture a subset of CII landscape areas in a water supplier's service areas

**Alternative Approach:**

- Stay consistent with the outdoor residential standard understanding that the water needs on CII landscapes are similar to those for residential landscapes

# Use ORWUS to Inform the CII-DIM Standard

ORWUS standard was developed through studies, discussions with stakeholders, landscape professionals, and experts. This provides a solid foundation for CII-DIM Standard.

CII-DIM Standard is similar to ORWUS, but adjustments are required:

- More diverse landscape types, uses, and sizes
- For reporting requirements, landscape areas irrigated with DIMs need to be separate from areas irrigated with MUMs
- More diverse considerations for incorporating MWELO principles including the Special Landscape Areas (SLAs)

# Principles of MWELO

*CWC Section 10609.9 "principles of the model water efficient landscape ordinance" means those provisions of the model water efficient landscape ordinance applicable to the establishment or determination of the amount of water necessary to efficiently irrigate both new and existing landscapes."*

WC does not require use of the specific MWELO factors or application at individual landscape levels because the CII outdoor efficient irrigation water use is calculated at the aggregated supplier-level.

Potential provisions for incorporating into CII-DIM standard include, but are not limited to, the following:

a) evapotranspiration adjustment factors, as applicable;
b) landscape area;
c) maximum applied water allowance;
d) reference evapotranspiration; and
e) special landscape areas (SLA), including provisions governing evapotranspiration adjustment factors for different types of water (e.g., recycled water)

# Special Landscape Areas (SLAs) and Exempt Landscapes under MWELO (2015)

SLAs:

- Dedicated solely to edible plants (e.g., community gardens)
- Active and passive recreational areas (e.g., outdoor event spaces and sports fields)
- Recycled water irrigated areas
- Water features using recycled water

Exempt from MWELO or calculation of Maximum Applied Water Allowance:

- Registered local, state, or federal historical sites;
- Ecological restoration projects that do not require a permanent irrigation system;
- Mined-land reclamation projects that do not require a permanent irrigation system; or
- Existing plant collections, as part of botanical gardens and arboretums open to the public
- Cemeteries: Gov. Code Section 65598 categorically exempts cemeteries from most provisions in MWELO including adherence to a water budget.

# CII-DIM Standard Approach

## Considerations:

1. Build on the ORWUS, associated research, and existing MWELO
2. Consider additional applications for MWELO principles
3. Consult with water suppliers, landscape irrigation professionals, UCANR, and other experts to refine or revise

- MWELO Non-residential ETAF is 0.1 less than Residential; thus,
  - 2023-2030: ORWUS ETF = 0.8, therefore Non-Residential Regular = 0.7
  - After 2030: ORWUS ETF = 0.65, therefore Non-Residential Regular = 0.55
- MWELO
  - ETAF = 0.45 for new landscapes
  - Exempted landscapes
  - ETAF of 1.0 for SLAs

# CII-DIM Standard Approach that is not Pursued

Real-world Data for Existing CII Landscape Water Use Efficiency from Some Efficient Water Suppliers: ETF of 0.7 is not supported

| Location or Source | Efficient ETAF* | Additional Information |
|---|---|---|
| Bay Area (primarily) and North Central Valley | 0.9 | Plus a recycled water adjustment factor |
| Southern CA Water Supplier | 0.8 | |
| Southern CA Water Supplier | 0.93 | 0.8 for using potable water, 1.0 for RW |
| North Central Valley Water Supplier | 0.7 | |
| University of CA – Agriculture and Natural Resources, Davis | 1.1** | With improvements may get to 0.9 - 0.75 (need additional data for validation) |
| *Does not include effective precipitation<br>**General CII landscapes not necessarily efficient | | |

Note: MWELO was not included in building codes until 2011; Annual MWELO reporting first required in 2015

# Proposed CII-DIM Standard

| Non-Residential Regular Landscape Area | ETF |
|---|---|
| Existing Landscapes: | |
| 2023 through 2029 | 0.8 |
| 2030 forward | 0.65 |
| New and Rehabilitated Landscapes (2015 MWELO) | 0.45 |

(more in the next slide)



[SUBJECT TO CHANGE BASED ON STAKEHOLDER FEEDBACK AND DWR REVIEW]

# Proposed CII-DIM Standard (cont'd)

- Keep MWELO SLAs
- Keep MWELO exempt landscapes
- Consider expanding SLAs to include:
  - Redirected considerations from variance development including engineered slopes should be managed with a DIM (under evaluation)
  - Instead of a variance, allow for water suppliers the option to consider supplemental water to ponds or lakes for sustaining wildlife supplied by a DIM as an SLA
  - CII water use for maintain water level or volume for intended public functions
  - Public swimming pools



[SUBJECT TO CHANGE BASED ON STAKEHOLDER FEEDBACK AND DWR REVIEW]

# Proposed CII-DIM Standard (cont'd): Recycled Water

**About recycled water use:**

Using an SLA ETF of 1.0 in UWUO calculation with recycled water for CII landscape irrigation does not mean that water suppliers can apply that amount.

- Allowable recycled water use is still subject to other regulations (e.g., Salt and Nutrient Management Plans, Waste Discharge Requirements, Anti-Degradation Policy).

Same rules apply to the variance which is being developed for unique situations where using recycled water with high total dissolved solids for irrigation necessitates an ETF higher than the SLA ETF.

# CII-DIM UWUO Volume of Water

**2023 through 2029 $UWUO_{CII\text{-}DIM}$ =**

(0.62) x [(CII-DIM Regular Landscape Area) x (0.8) x (ETo-Peff)
+ (New Landscape Area) x (0.45) x (ETo) + (SLA) x (ETo)]
+ Exempt Water Volume

Percent of Water Delivered Per Connection-Type

| Type of Connection | Percent of Total Delivered |
|---|---|
| DIM | 10.5 |
| CII | 20 |
| Residential (SFR+MFR) | 69.5 |
| Other | < 1 |

Source: 2020 eAR Data (excluding City of Imperial and Glendora)

# For Calculating the $UWUO_{CII\text{-}DIM,}$ Water Suppliers Will Need To:

1. Identify and locate CII-DIMs or implement DIM-equivalent technologies, if applicable.

   For HOA and Multifamily Residential DIMs, including recycled water DIMs, water suppliers retain the discretion to consider them CII-DIMs or Residential DIMs since these types of landscapes served by a DIM will functionally be irrigated using same management practices as other CII-DIMs, so long as the landscape area is not double-counted (used in both the ORWUS and CII-DIM Standard calculations).

2. Identify CII-DIMs or DIM-equivalent technologies serving cemeteries, historic sites, public botanical gardens and arboretums if exemption is desired.

3. Identify the SLAs DIMs or DIM-equivalent technologies, if applicable

# For Calculating the $UWUO_{CII\text{-}DIM,}$ Water Suppliers Will Need To (cont'd):

4. Measure irrigated area associated with CII-DIMs or DIM-equivalent technologies – there is no irrigable-not-irrigated component because it either is or is not irrigated with a DIM:
   - Identify and measure existing Non-Residential Regular landscape areas with DIMs
   - Identify and measure qualifying landscape greater than the threshold with MUMs
   - Identify and measure SLAs with DIMs
5. Record appropriate data from MWELO reports for New landscape area and/or require irrigated landscape area reporting for New service connections.
   - This may require a land use authority communication plan and strategy for ensuring receipt of reports.

# Water Supplier Distribution of DIM Connections

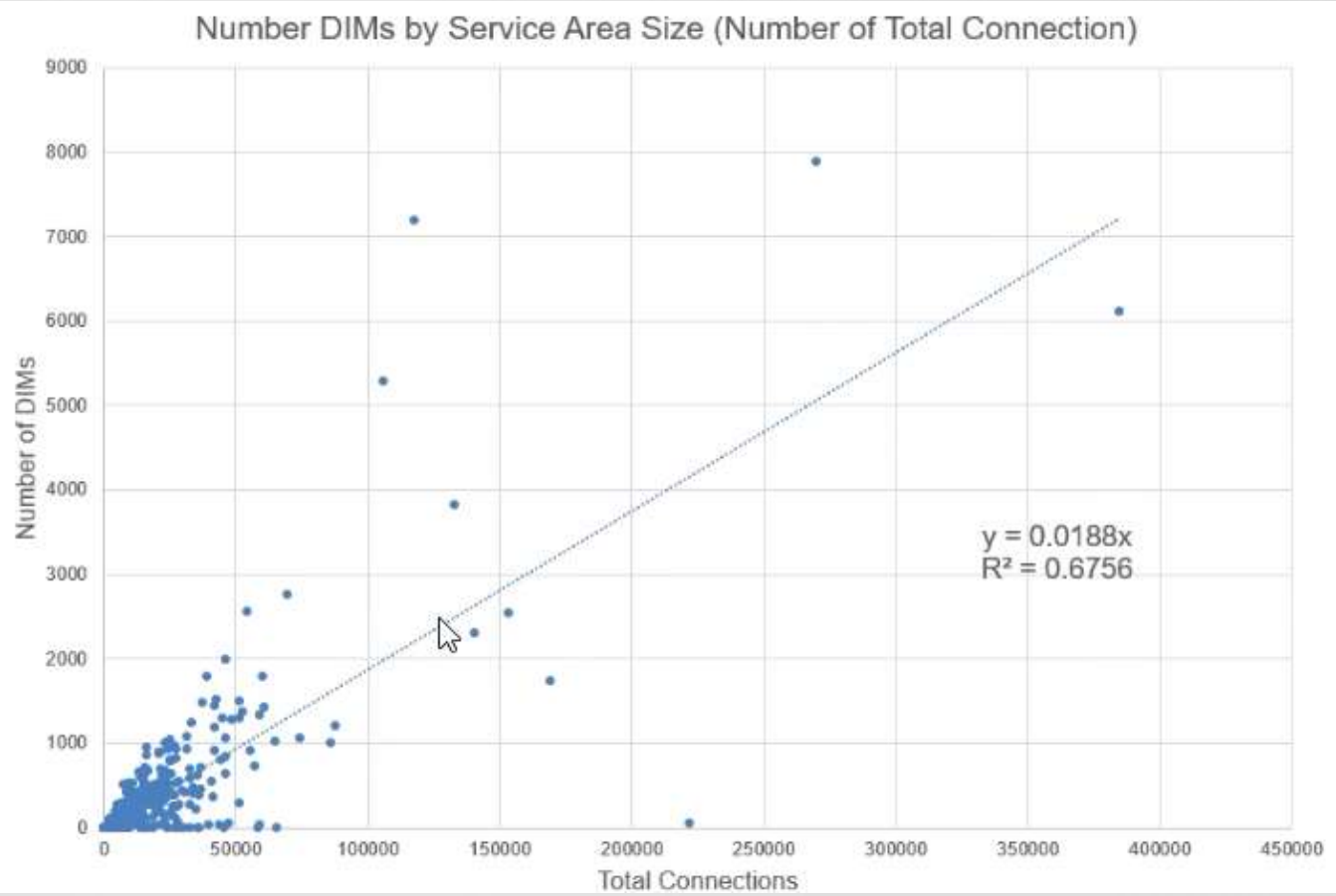
Acknowledging that not all DIMs are CII-DIMs

| Statistic | Number of DIM Connections |
|---|---|
| Lower 25th Percentile | 22 |
| Median (50th Percentile) | 122 |
| Upper 25th Percentile) | 403 |
| 90th Percentile | 886 |

Source: 2020 eAR data (n=401) excluding LADWP and City of Millbrae

# Number of DIMs as a Function of Water Supplier Size

Number of DIMs ≈ 2% of total number of connections (2020 eAR)




CALIFORNIA DEPARTMENT OF WATER RESOURCES

# Defining Equivalent Technology

*10609.20(c)(3) Aggregate estimated efficient outdoor irrigation of landscape areas with dedicated irrigation meters or equivalent technology in connection with CII water use.*

Criteria:

1. Measures water volume with similar accuracy as existing CII-DIMs **and**
2. Reports similar data **to the water supplier**

Equivalent technology =

*"Identical or functionally equivalent to the existing component."*

*Examples:* ***IF*** data is reported to water suppliers: submeters, Flume-type flow sensors, in-line flow meters

Source: Argen | Utility Billing and Water Submetering (argeninc.com)

CALIFORNIA DEPARTMENT OF WATER RESOURCES

# Related CII-DIM Performance Measures

*WC 10609.10 (b)(2) Recommendations for setting minimum size thresholds for converting mixed CII meters to dedicated irrigation meters, and evaluation of, and recommendations for, technologies that could be used in lieu of requiring dedicated irrigation meters.*

a.) Minimum size thresholds for converting CII-mixed use meters (MUMs) to CII-DIMs or DIM-equivalent technology and

b.) Technologies that could be used in-lieu of requiring CII-DIMs

# Volumetric Threshold for Conversion Performance Measure No Longer Considered

**Proposed Concept: volumetric threshold**

- MAWA threshold presented for consideration: June 28th, 2021, CII Workshop # 4

**Reasons for dismissing a volumetric threshold:**

- Inconsistent with WC 10609.10 (b)(2) – which specifies “size threshold”
- Volume does not account for:
  - Principles of MWELO – WC 10609.9
  - Diversity of CII business practices
  - Efficiency or reasonableness of use
- ETo for similar plant palettes will vary based on local climate conditions
- Burden on suppliers to calculate for each CII landscape (area, plant factors, irrigation efficiency) just to find out which ones are at or above the threshold

# Performance Measure: Threshold for Conversion

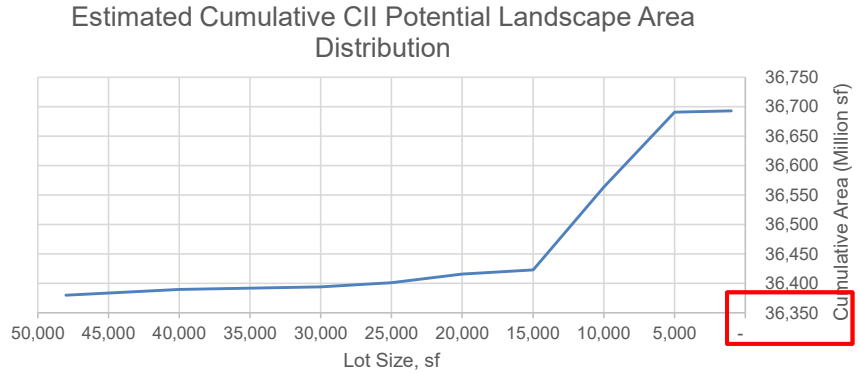
## Considerations:

1. Based on irrigated landscape area size
2. Conversion to a DIM or DIM-equivalent technology = subject to CII-DIM Standard
3. Conversion to in-lieu technology = subject to performance measures reporting

## Considering a threshold of 20,000 $ft^2$

| Size of Site (square feet) | % of Total sites greater than "x" square feet |
|---|---|
| 10,000 | 90% |
| 15,000 | 80% |
| 20,000 | 70% |
| 30,000 | 60% |
| 35,000 | 50% |
| 50,000 | 40% |
| 65,000 | 30% |
| 100,000 | 20% |
| 170,000 | 10% |
| More | 0% |

Data provided by Bay Area Water Management Company (4,767 managed Sites from four agencies)




SWB analysis of 2018 LandVision Statewide Data provides a gross estimate of CII Irrigated Landscapes where: Area = Parcel Size – Building Footprint. Actual landscape area will be much smaller.

CALIFORNIA DEPARTMENT OF WATER RESOURCES

# Defining In-Lieu Technologies

- **In-lieu technologies does not mean equivalent technologies**
- In-lieu technology does not have to be functionally equivalent to a DIM, but as a Performance Measure, **it needs to result in increased water use efficiency.**

> *WC 10608.1 - Performance measures" means actions to be taken by urban retail water suppliers that will result in increased water use efficiency by CII water users. Performance measures may include, but are not limited to, educating CII water users on best management practices, conducting water use audits, and preparing water management plans. Performance measures do not include 2(n) "process water.*

# Performance Measure: In lieu technologies (concept)

**Required of all in lieu technology:**

Monitoring, Maintenance, Operations, and Communication BMPs ***and*** one or more following options:

**Option:** Water Budget-Based Rates with specific criteria (existing technology)

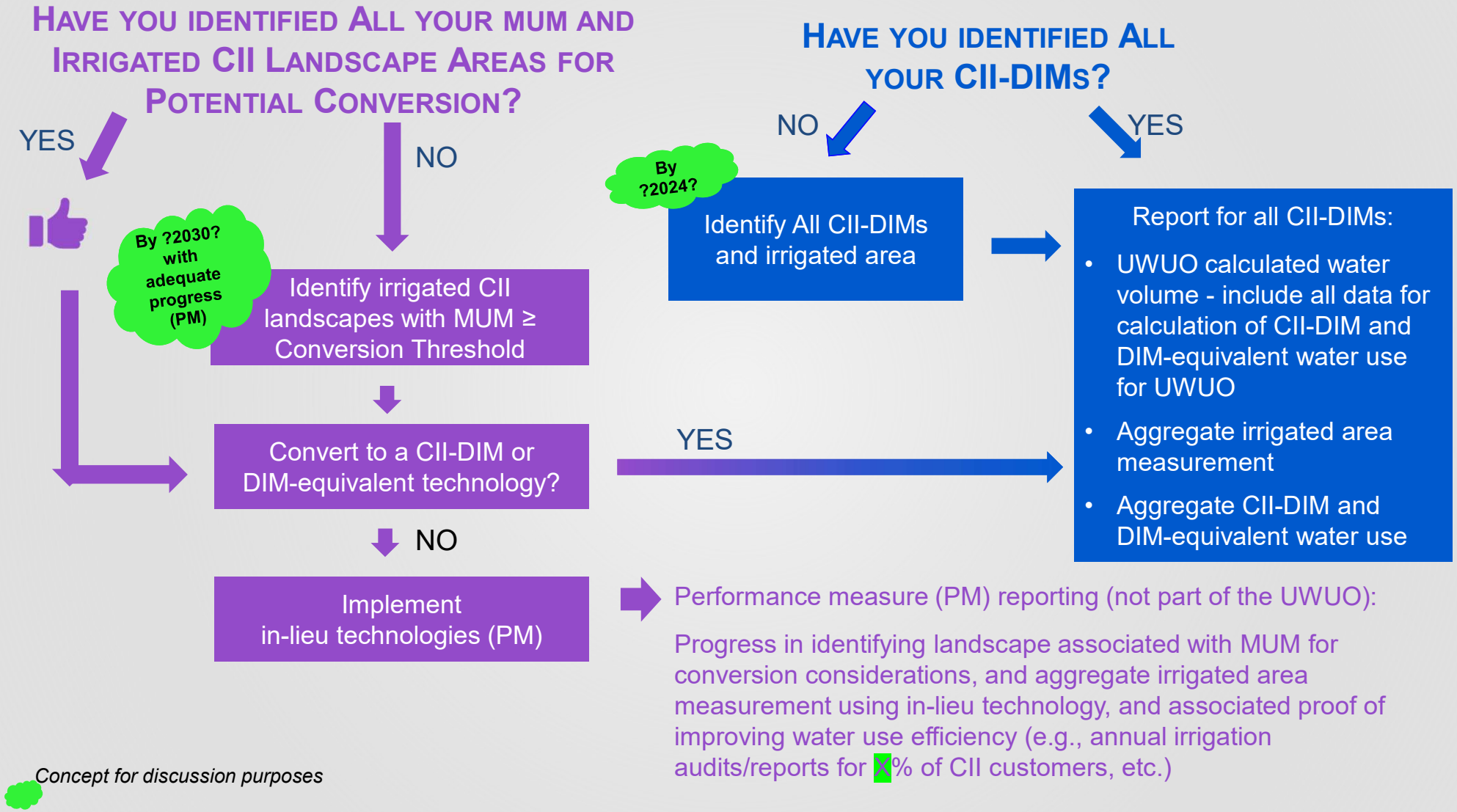
- allocations for Non-Residential outdoor landscapes based on CII-DIM Standard ETFs
- aggregate estimate of irrigated landscape area and SLAs
- customer indoor water use budget developed through a water audit and customer information

**Option:** Water Budget-Based Management based on CII-DIM Standard ETFs (existing technology)

- aggregate estimate of irrigated landscape area and SLAs
- Reporting and tracking

**Option:** Equipment replacement or retrofit for enhanced function and performance (existing technology)

**Other options may be possible as long as they can demonstrate the improvement in water use efficiency for CII landscape irrigation.**


HAVE YOU IDENTIFIED ALL YOUR MUM AND IRRIGATED CII LANDSCAPE AREAS FOR POTENTIAL CONVERSION?
YES
NO
By ?2030? with adequate progress (PM)
Identify irrigated CII landscapes with MUM ≥ Conversion Threshold
Convert to a CII-DIM or DIM-equivalent technology?
YES
NO
Implement in-lieu technologies (PM)
HAVE YOU IDENTIFIED ALL YOUR CII-DIMS?
NO
YES
By ?2024?
Identify All CII-DIMs and irrigated area
Report for all CII-DIMs:
• UWUO calculated water volume - include all data for calculation of CII-DIM and DIM-equivalent water use for UWUO
• Aggregate irrigated area measurement
• Aggregate CII-DIM and DIM-equivalent water use
Performance measure (PM) reporting (not part of the UWUO):
Progress in identifying landscape associated with MUM for conversion considerations, and aggregate irrigated area measurement using in-lieu technology, and associated proof of improving water use efficiency (e.g., annual irrigation audits/reports for X% of CII customers, etc.)
Concept for discussion purposes

# CII Performance Measures

Under Development

Design

Implementation

Tracking

Reporting

# CII Outdoor Landscape Area with DIM Standard Recommendations

# Q&A

**Workgroup members**:

- Please use the **'handraise' function** (located in the participants panel) to get into a queue or use the **Chat panel** to write in questions and comments.

**Members of the public:**

- Please use the **Q&A Panel** to ask questions and provide comments.

# Discussion & Feedback

- Can the CII-DIM standard be implemented on the same recommended **schedule** being proposed for the ORWUS? (0.8 in 2023 and 0.65 in 2030)
- What should be a MUM conversion **threshold** given that in-lieu technology could be used instead of a DIM or other water measurement device?
- As currently proposed, in-lieu technologies need to demonstrate increased water use efficiency for CII outdoor landscape use and this can be accomplished with combining additional BMPs, procedures and practices. Any **addition/subtraction/modification** to this view? Are there additional concepts of in-lieu technologies we should include in consideration?
- For meeting the CII DIM standard in the timetable specified, what **assistance program(s)** may need to be in place?"

CALIFORNIA DEPARTMENT OF WATER RESOURCES

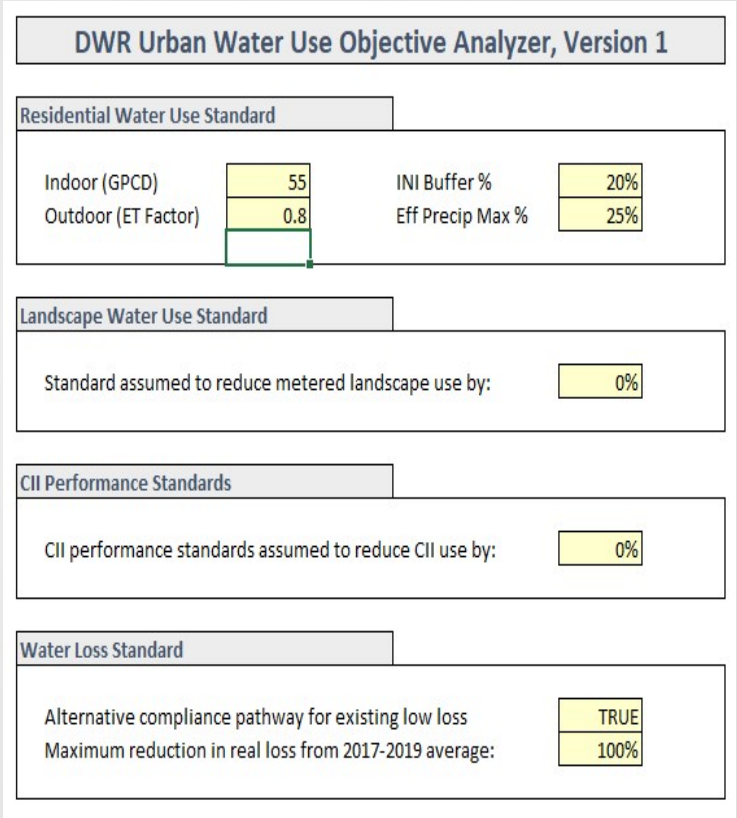
# Capping Considerations for Total Water Use Reductions

**Bekele Temesgen**, Manager
Land and Water Use Section, California Department of Water Resources

# Impacts on Supplier's Total Water Use

- DWR developed a tool to compare objective based total water use to the SB X7-7 2020 statewide conservation target
- The tool is also used to assess how the proposed standards affect individual water supplier's compliance
- Water use objective compliance is based on the overall objective and not the individual standards

Note: DWR will discuss the tool and its functions in an upcoming stakeholder workshop on November 12, 2021



# Objective Based Total Water Use

- Objective based total water use is compared to actual total water use to test compliance
- Objective based total water use = water use objective + CII (not DIM) + Other uses (authorized unbilled, apparent water loss)
- Water use objective = efficient indoor + efficient outdoor + efficient CII outdoor with DIM + efficient water loss
- Efficient CII outdoor with DIM cannot be calculated in this analysis because CII DIM landscape areas have not been measured. Current landscape meter is used instead.
- Efficient water loss is taken from water board's draft December 2020 standards and incorporates board's alternative compliance pathway
- Therefore, the total water use analysis conducted here should not be considered final as they can change when complete and final data is obtained

# Total Water Use Exceedance

## Indoor Standard = 55 gpcd & Outdoor Standard = 0.70

| Parameter | Exceedance (%)[1] | | | | |
|---|---|---|---|---|---|
| | 0 | 0 - 10 | 10 - 20 | 20 - 30 | >30 |
| Frequency[2] | 257 | 77 | 34 | 17 | 13 |
| Proportion (%)[3] | 65.0 | 19.0 | 9.0 | 4.0 | 3.0 |
| Mean Exceedance (%)[4] | 0.0 | 4.6 | 14.2 | 21.9 | 41.4 |

[1]Exceedance – the percentage by which actual water use exceeds water use objective

[2]Frequency – number of suppliers in each bin

[3]Proportion – ratio of frequency to the total number of suppliers (398)

[4]Mean Exceedance – the average of all exceedances in each bin

# Total Water Use Exceedance

## Indoor Standard = 55 gpcd & Outdoor Standard = 0.80

| Parameter | Exceedance (%)[1] | | | | |
|---|---|---|---|---|---|
| | 0 | 0 - 10 | 10 - 20 | 20 - 30 | >30 |
| Frequency[2] | 295 | 58 | 30 | 6 | 9 |
| Proportion (%)[3] | 74.0 | 15.0 | 8.0 | 2.0 | 2.0 |
| Mean Exceedance (%)[4] | 0.0 | 4.4 | 13.7 | 24.1 | 39.8 |

[1]Exceedance – the percentage by which actual water use exceeds water use objective

[2]Frequency – number of suppliers in each bin

[3]Proportion – ratio of frequency to the total number of suppliers (398)

[4]Mean Exceedance – the average of all exceedances in each bin

# Total Water Use – Side-by-Side Comparison

## Total Water Use Exceedance

### Indoor Standard = 55 gpcd & Outdoor Standard = 0.70

| Parameter | Exceedance (%)[1] | | | | |
|---|---|---|---|---|---|
| | 0 | 0 - 10 | 10 - 20 | 20 - 30 | >30 |
| Frequency[2] | 257 | 77 | 34 | 17 | 13 |
| Proportion (%)[3] | 65.0 | 19.0 | 9.0 | 4.0 | 3.0 |
| Mean Exceedance (%)[4] | 0.0 | 4.6 | 14.2 | 21.9 | 41.4 |

[1]Exceedance – the percentage by which actual water use exceeds water use objective
[2]Frequency – number of suppliers in each bin
[3]Proportion – ratio of frequency to the total number of suppliers (398)
[4]Mean Exceedance – the average of all exceedances in each bin

CALIFORNIA DEPARTMENT OF WATER RESOURCES

## Total Water Use Exceedance

### Indoor Standard = 55 gpcd & Outdoor Standard = 0.80

| Parameter | Exceedance (%)[1] | | | | |
|---|---|---|---|---|---|
| | 0 | 0 - 10 | 10 - 20 | 20 - 30 | >30 |
| Frequency[2] | 295 | 58 | 30 | 6 | 9 |
| Proportion (%)[3] | 74.0 | 15.0 | 8.0 | 2.0 | 2.0 |
| Mean Exceedance (%)[4] | 0.0 | 4.4 | 13.7 | 24.1 | 39.8 |

[1]Exceedance – the percentage by which actual water use exceeds water use objective
[2]Frequency – number of suppliers in each bin
[3]Proportion – ratio of frequency to the total number of suppliers (398)
[4]Mean Exceedance – the average of all exceedances in each bin

CALIFORNIA DEPARTMENT OF WATER RESOURCES

CALIFORNIA DEPARTMENT OF WATER RESOURCES

# Total Water Use Exceedance

## Indoor Standard = 50 gpcd & Outdoor Standard = 0.65

| Parameter | Exceedance (%)[1] | | | | |
|---|---|---|---|---|---|
| | 0 | 0 - 10 | 10 - 20 | 20 - 30 | >30 |
| Frequency[2] | 184 | 115 | 53 | 30 | 16 |
| Proportion (%)[3] | 46.0 | 28.0 | 13.0 | 8.0 | 4.0 |
| Mean Exceedance (%)[4] | 0.0 | 4.5 | 14.8 | 25.8 | 46.0 |

[1]Exceedance – the percentage by which actual water use exceeds water use objective

[2]Frequency – number of suppliers in each bin

[3]Proportion – ratio of frequency to the total number of suppliers (398)

[4]Mean Exceedance – the average of all exceedances in each bin

# Capping considerations for Total Water Use Reductions

- The number of suppliers that comply with the legislative requirement increased when the outdoor standard was raised from the provisional standard of 0.70 to 0.80.
- However, some suppliers still needed to reduce their total water user by a significant amount.
- Using 50 gpcd for indoor water use standard, the proposed 0.65 outdoor residential water use standard, and current actual water use (2017-2019), 54% of suppliers need to reduce their total water use to comply
- For these reasons, DWR will recommend to the water board to consider capping the amount of total water use reductions per year for a limited time

CALIFORNIA DEPARTMENT OF WATER RESOURCES

# Next Steps

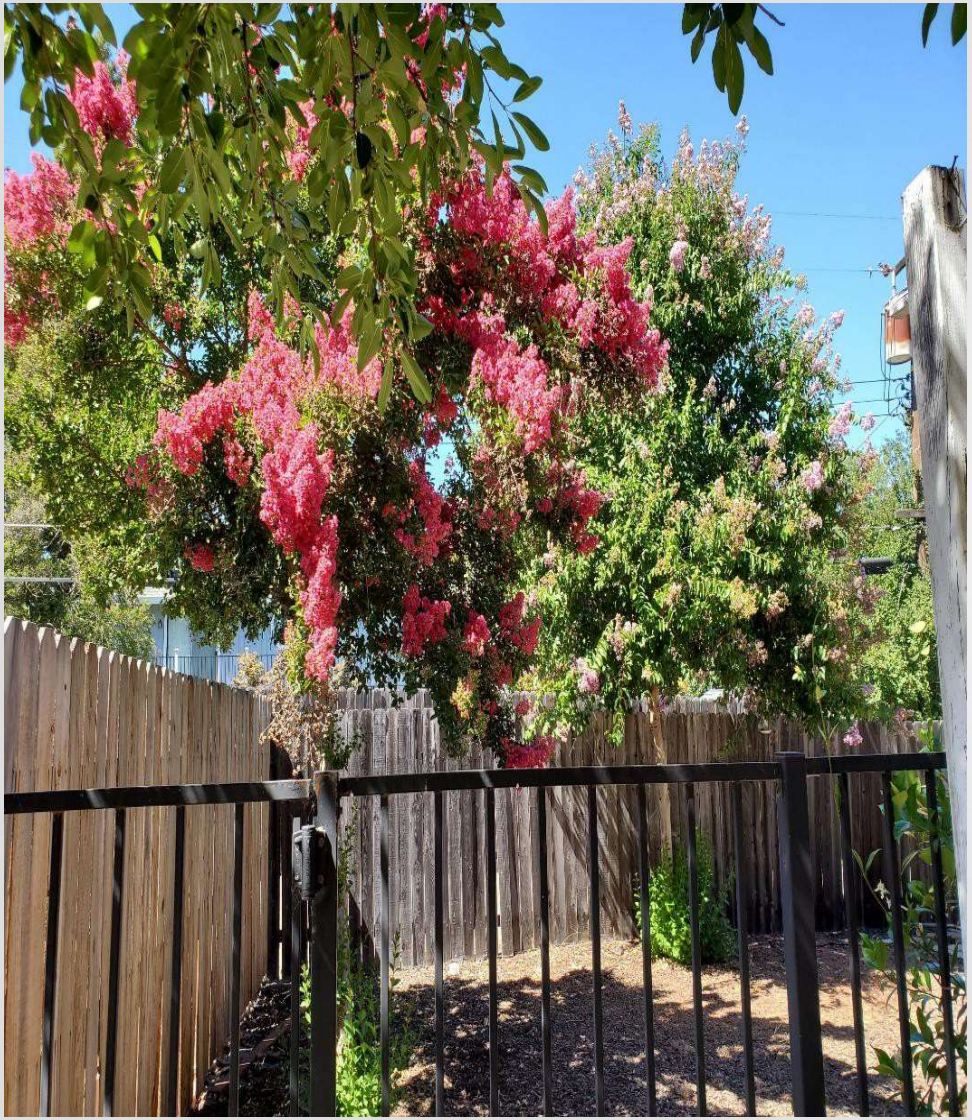
**Manucher Alemi**, Policy Advisor
California Department of Water Resources

# Planned Schedule Moving Forward

| Topic Recommendations (December Package) | Draft Recommendations Available to Stakeholders | Stakeholders/ Public Meeting | | | Stakeholder/ Public Comments Due to DWR | Submit to the Water Board |
|---|---|---|---|---|---|---|
| | 10-Nov | 12-Nov | 16-Nov | 17-Nov | 18-Nov | Dec |
| Outdoor Residential Standard | x | | x | | x | x |
| CII- DIM Standard | x | | x | | x | x |
| (SBX7-7 Comparison) | x | x | x | | x | x |
| Variances | x | | | x | x | x |
| Bonus Incentives | x | | | x | x | x |
| CII Classification System | x | | | x | x | x |
| Guidelines and Methodologies (Lite) | x | x | | x | x | x |

# Next Steps

- Workshop materials will be posted on the stakeholder SharePoint https://cawater.sharepoint.com/sites/dwr-wusw/SitePages/Standards,-Methodologies-and-Performance-Measures.aspx
- **Upcoming meetings:**
  - November 12, 2021, 1PM – 4PM
  - November 16, 2021, 1PM – 4PM
  - November 17, 2021, 9AM – 12PM and 1:30PM – 5PM



# THANK YOU!

Contact:

WUEStandards@water.ca.gov

SharePoint:

To register, please email WUE@water.ca.gov

https://cawater.sharepoint.com/sites/dwr- wusw/SitePages/Home.aspx