Recommendations for Urban Water Use Efficiency Standards, Variances, Performance Measures, and Annual Water Use Reporting

WUES-DWR-2021-01A

A Report to the State Water Resources Control Board Prepared Pursuant to California Water Code Section 10609

September 2022

California Department of Water Resources
Water Use Efficiency Branch

Note: This report is part of the package of reports developed by the California Department of Water Resources to meet the requirements of Senate Bill 606 and Assembly Bill 1668 of 2018 for urban water use efficiency.

State of California
Gavin Newsom, Governor

California Natural Resources Agency
Wade Crowfoot, Secretary for Natural Resources
Saul Gomez, Undersecretary
Andrea Ambriz, Deputy Secretary for External Affairs

California Department of Water Resources
Karla A. Nemeth, Director
Cindy Messer, Lead Deputy Director

Deputy Directors

Business Operations
Stephanie Varrelman

Climate Resilience
John Andrew

Flood Management and Dam Safety
Gary Lippner

Integrated Watershed Management
Kristopher A. Tjernell

Security and Emergency Management Program
John Paasch

Special Initiatives
Bianca Sievers

State Water Project
Ted Craddock

Statewide Water and Energy
Vacant Position

Sustainable Groundwater Management
Paul Gosselin

Legislative Affairs
Kasey Schimke

Public Affairs
Margaret Mohr

Office Executives

Office of General Counsel
Thomas R. Gibson

Government and Community Liaison
Anecita Agustinez

Internal Audit Office
David Whitsell

Office of Workforce Equality
Tiffany Vital

Division of Regional Assistance
Arthur Hinojosa, Manager

Water Use Efficiency Branch
Ryan Bailey, Manager
Peter Brostrom (in memoriam)[1]

Recommendations for Urban Water Use Efficiency Standards, Variances, Performance Measures, and Annual Water Use Reporting Project Team

California Department of Water Resources

Water Use Efficiency Branch
Sabrina Cook
Bekele Temesgen
Shem Stygar
Morteza Orang
Ricardo Trezza
Stanley Mubako
Scott Hayes
Julie Saare-Edmonds

Division of Planning
Manucher Alemi, Policy Advisor

Division of Regional Assistance
Matthew Bates, Assistant Manager
Diana S. Brooks, Policy Advisor

Integrated Watershed Management
Teji Sandhu, Policy Advisor to the Deputy Director
Andria Avila, Executive Assistant to the Deputy Director

Special Restoration Initiatives Branch
James Campagna, Office Technician

[1] Peter Brostrom served as the California Department of Water Resources Water Use Efficiency Branch Manager through October 29, 2020, and he was instrumental in assembling the stakeholder working groups and study design.

Water Use Studies Working Group Members

Arcadis
Greg Imamura

Association of California Water Agencies
Dave Bolland

California American Water
Patrick Pilz

Camrosa Water District
Charlotte Lopez

City of Sacramento
William Granger

Coachella Valley Water District
Jason Lucas

County of Napa
Christopher M. Silke

Eastern Municipal Water District
Sara Quintero

Ecolab
Mark Muellner

Irvine Ranch Water District
Amy McNulty

Kennedy Jenks Consultants
Meredith Clement

Long Beach Water Department
Dean Wang

Los Angeles Department of Water and Power
Terrence McCarthy

Moulton Niguel Water District
Justin Finch

Municipal Water District of Orange County
Rachel Waite

Natural Resources Defense Council
Tracy Quinn

Niemela Pappas & Associates
Tiffany Phan

Pacific Institute
Heather Cooley

Plumbing Manufacturers International
Cambria McLeod

Rancho California Water District
Jason Martin

Private Citizen
Martha Davis

Sacramento Suburban Water District
Greg Bundesen

San Francisco Public Utilities Commission
Julie Ortiz

San Jose Water
Courtney Rubin

Santa Clarita Valley Water Agency
Matthew S. Dickens

Sonoma-Marin Saving Water Partnership
Chelsea Thompson

South Tahoe Public Utility District
Shelly Thomsen

Stanford University
Newsha Ajami

Valley County Water District
Tara Robinson

Valley Water
Metra Richert

Walnut Valley Water District
Donna DiLaura

WateReuse CA
Charles LaSalle

Western Municipal Water District
Jason Pivovaroff

WaterNow Alliance
Caroline Koch

West Yost Associates
Elizabeth Drayer

Standards, Methodologies, and Performance Measures Working Group Members

Alameda County Water District
Stephanie Nevins

Association of California Water Agencies
Dave Bolland

Bay Area Water Supply and Conservation Agency
Andree Johnson

California Water Service
Ken Jenkins

City of Glendale
Michael De Ghetto

City of Lakewood
Toyasha Sebbag

City of Petaluma
Chelsea Thompson

City of Pleasanton
Rita Di Candia

City of Sacramento
Roshini Das

City of Santa Monica
Russell Ackerman

Coachella Valley Water District
Katie Evans

Contra Costa Water District
Bob Eagle

Delta Stewardship Council
Cory Copeland

East Bay Municipal Utility District
Alice Towey

Ecolab
Mark Muellner

EKI Environment & Water, Inc.
Kat Wuelfing

Gardenworks Inc.
Peter Estournes

Irvine Ranch Water District
Fiona Sanchez

Los Angeles Department of Water and Power
Sofia Marcus

Metropolitan Water District
Krista Guerrero

Mission Springs Water District
John M. Soulliere

Natural Resources Defense Council
Tracy Quinn

Olivenhain Municipal Water District
Brian Sodeman

Pacific Institute
Heather Cooley

Plumbing Manufacturers International
Cambria McLeod

Rancho California Water District
Tyson Heine

Regional Water Authority
Amy Talbot

San Diego County Water Authority
Elizabeth Lovsted

San Jose Water
Kurt Elvert

Santa Clara Valley Water District, Pajaro River Watershed
Samantha Greene

Stanford University
Newsha Ajami

Water Systems Optimization
Kate Gasner

WateReuse CA
Charles LaSalle

WaterNow Alliance
Caroline Koch

Western Municipal Water District
Karly Gaynor

Landscape Area Measurement Working Group Members

California Water Service
Ken Jenkins

Calaveras County
Joel Metzger

Contra Costa Water District
Chris Dundon and Bob Eagle

Eastern Municipal Water District
Elizabeth Lovsted and Sara Quintero

East Bay Municipal Utility District
Richard Harris, Alice Towey, and Charles Bohlig

City of Folsom
Don Smith

North Marin Water District
Ryan Grisso

Natural Resources Defense Council
Tracy Quinn

Pacific Institute
Heather Cooley

Padre Dam Municipal Water District
Melissa McChensey

Placer County Water Agency
Tony Firenzi

Rancho California Water District
Justin Haessly

Regional Water Authority
Amy Talbot

Retired Specialist
Tom Ash

San Margarita Water District
Nate Adams

Santa Ana Watershed Project Authority
Ian Achimore

Santa Rosa Water
Sean McNeil

San Francisco Public Utilities Commission
Julie Ortiz

South Tahoe Public Utility District
Shannon Cotulla and Shelly Thomsen

Waterfluence
John Whitcomb

Technical Consultants

Stantec Consulting Services Inc.
Yung-Hsin Sun
Maliheh Karamigolbaghi
Vanessa Nishikawa
Joan Oppenheimer
Kyleen Marcella
Jillian Young
Chengyan Chang
Connie Adera
Samuel Price

M.Cubed
David Mitchell

Western Policy Research
Anil Bamezai

University of California, Davis, Center for Water-Energy Efficiency
Jonathan Martindill
Yoni Ackerman
Frank Loge
Kendra Olmos

Maddaus Water Management Inc.
Lisa Maddaus
Michelle Maddaus

Sacramento State, College of Continuing Education, Consensus, and Collaboration Program
Orit Kalman
Sophie Carrillo-Mandel

Acknowledgements

The California Department of Water Resources (DWR) would like to acknowledge the collaboration and coordination with the staff of the State Water Resources Control Board in developing the recommendations and supporting content. In particular, DWR would like to recognize the input and constructive feedback from members of the Water Use Studies Working Group and Standards, Methodologies, and Performance Measures Working Group throughout the process, and their extensive time commitments for supporting this effort. Additional input and feedback from other stakeholders, interested parties, and the public are also greatly appreciated. DWR also would like to extend its gratitude for the valuable services from the consultant team that supported DWR in the needed studies, investigations, and analytical work.

Table Of Contents

Tables

Appendices

Abbreviations and Acronyms

2017 Framework	Making Water Conservation a California Way of Life, Implementing Executive Order B-37-16
2018 Legislation	2018 Legislation on Water Conservation and Drought Planning (Senate Bill 606 [Hertzberg] and Assembly Bill 1668 [Friedman], as amended)
AB	Assembly Bill
AMI	advanced metering infrastructure
BMP	best management practice
CDFA	California Department of Food and Agriculture
CEC	California Energy Commission
CII	commercial, industrial, and institutional
CII-BMP	commercial, industrial, and institutional water use best management practice
CII-BMPs Performance Measure	Commercial, Industrial, and Institutional Water Use Best Management Practices Performance Measure
CII Classification System PM	Commercial, Industrial, and Institutional Water Use Classification System Performance Measure
CII-DIM	commercial, industrial, and institutional dedicated irrigation meter
CII-DIMWUS	Commercial, Industrial, and Institutional Outdoor Irrigation of Landscape Areas with Dedicated Irrigation Meters Water Use Efficiency Standard
CII Water Supplier BMPs	commercial, industrial, and institutional water use best management practices implemented by urban retail water suppliers
CII Water User BMPs	commercial, industrial, and institutional water use best management practices implemented by commercial, industrial, and institutional water users or associated property owners or managers
Conversion Threshold PM	Conversion Threshold Performance Measure
CPUC	California Public Utilities Commission
DIM	dedicated irrigation meter
DPR	direct potable reuse

DWR	California Department of Water Resources
ETF	evapotranspiration factor
GC	California Government Code
gpcd	gallons per capita per day
II	irrigable-irrigated
INI	irrigable-not irrigated
In-Lieu Technologies PM	In-Lieu Technologies Performance Measure
IPR	indirect potable reuse
IRWUS	Indoor Residential Water Use Efficiency Standard
Legislature	California State Legislature
mg/L	milligrams per liter
MWELO	Model Water Efficient Landscape Ordinance
ORWUS	Outdoor Residential Water Use Efficiency Standard
Recommendation Package	Urban Water Use Efficiency Recommendation Package
SB	Senate Bill
SLA	Special Landscape Area
State	State of California
State Water Board	State Water Resources Control Board
TDS	total dissolved solids
UWUO	urban water use objective
WC	California Water Code
WLS	Water Loss Standard
WUS	Water Use Studies

Executive Summary

The California State Legislature passed the 2018 Legislation on Water Conservation and Drought Planning (Senate Bill (SB) 606 [Hertzberg] and Assembly Bill 1668 [Friedman], as amended; hereinafter referred to as the "2018 Legislation"), which included provisions for advancing urban water use efficiency through developing and implementing various water use efficiency standards, variances, and performance measures. Through California Water Code Section 10609, the 2018 Legislation directs the California Department of Water Resources (DWR), in coordination with the State Water Resources Control Board (State Water Board), to conduct necessary studies and investigations to prepare recommendations for the State Water Board's adoption on the following urban water use efficiency standards, variances for unique water uses, and performance measures for commercial, industrial, and institutional (CII) water use.

- Standards for outdoor residential use that incorporate the principles of the Model Water Efficient Landscape Ordinance (MWELO) adopted by DWR.
- 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, that incorporate the principles of the MWELO adopted by DWR.
- Appropriate variances for unique uses that can have a material effect on an urban retail water supplier's urban water use objective (UWUO) and threshold of significance for each recommended variance.
- Appropriate methods for calculating the bonus incentive for potable reuse for qualified adjustments to an urban retail water supplier's UWUO.
- Guidelines and methodologies for the State Water Board to adopt that identify how an urban retail water supplier calculates its UWUO and supporting data requirements.
- Performance measures for CII water use:
  - A CII water use classification system for the State of California (State) to address significant uses of water.
  - A minimum size threshold for converting mixed CII meters to dedicated irrigation meters (DIM) and evaluation of, and recommendations for, technologies that could be used in lieu of requiring DIMs.
  - CII water use best management practices, which may include, but are not limited to, water audits and water management plans for CII customers

exceeding a certain recommended size, volume of water use, or other threshold.

These recommendations for long-term urban water use efficiency reflect technical considerations, public input, and the imperative to continue the State's progress in efficient use of water for future generations. If adopted, DWR's recommendations on outdoor residential and CII water use on landscapes with DIMs – combined with the indoor residential water use standard recently amended through SB 1157 (Hertzberg, 2022), and the Water Loss Standard considered by the State Water Board in a separate rulemaking process (pursuant to SB 555 of 2015) – would result in expected long-term water savings of approximately 442,000 acre-feet per year starting in 2030. This saving equates to enough water to supply more than 1.1 million homes or 3.3 million residents for both indoor and outdoor annual water needs.

Consistent with the legislative directive, DWR established a robust public process involving a diverse group of stakeholders, including urban retail water suppliers, non-profit organizations, and other interested parties, for the review and development of the recommendations. Working groups were convened to assist in the development of the recommendations and served as the primary forums for engaging the public and stakeholders, including State agencies, cities, counties, urban retail water suppliers, environmental organizations, and other interested parties. Working group members and stakeholders were provided with many opportunities to comment on and inform the suitability and practical application of the recommended standards, variances, and performance measures, and guidelines and methodologies to calculate the UWUO. Additionally, their input informed the development and refinements for, the applicable scope, options, specifications, guidelines, and methodologies for implementation. Technical feasibility, financial considerations, and associated potential economic effects on urban retail water suppliers and CII sectors were also considered during the development of the recommendations.

DWR has completed a significant body of work to meet the requirements of the 2018 Legislation and provides recommendations on different topics to the State Water Board for adoption. Specifically, this report, *Recommendations for Urban Water Use Efficiency Standards, Variances, Performance Measures, and Annual Water Use Reporting* (WUES-DWR-2021-01A), provides the overall summary of DWR's efforts and its resulting recommendations.

To streamline document development and recognize the inherent interrelationship among different topics and the need for overall consistency, DWR organized the various reports in an Urban Water Use Efficiency Recommendation Package (Recommendation Package) that allows mutual referencing and incorporates content by reference. Each of the reports included in DWR's Recommendation Package details DWR's methods, technical analyses, studies, public input, and resulting recommendations. As such, the Recommendation Package provides a complete context of the consistency and

coordination among different topics and DWR's integrated approach to streamline the implementation of these recommendations. DWR's Recommendation Package is to be transmitted to the State Water Board for adoption.

This page left blank intentionally.

1.0 Introduction

Senate Bill (SB) 606 (Hertzberg) and Assembly Bill (AB) 1668 (Friedman) of 2018, as amended (hereinafter referred to as the "2018 Legislation"), established a new foundation for long-term improvements in water conservation and drought planning to adapt to climate change and the resulting longer and more intense droughts in the State of California (State). These two bills provide expanded and new authorities and requirements to enable permanent changes and actions for those purposes, thereby improving the State's water future for generations to come.

1.1 Background

SB 606 and AB 1668 are direct outcomes of California Governor Edmund G. Brown Jr.'s Executive Order B-37-16, issued in May 2016. Executive Order B-27-16 directs the California Department of Water Resources (DWR), State Water Resources Control Board (State Water Board), California Public Utilities Commission (CPUC), California Department of Food and Agriculture (CDFA), and California Energy Commission (CEC) to develop a long-term framework for water conservation and drought planning. The resulting recommendations in an April 2017 report titled *Making Water Conservation a California Way of Life, Implementing Executive Order B-37-16* (2017 Framework) (DWR et al., 2017) and subsequent extensive legislative outreach efforts informed the development of SB 606 and AB 1668. For additional information on SB 606, AB 1668, and the 2017 Framework, refer to *Making Water Conservation a Way of Life: Primer of 2018 Legislation on Water Conservation and Drought Planning, Senate Bill 606 (Hertzberg) and Assembly Bill 1668 (Friedman)* (DWR and State Water Board, 2018).

The 2017 Framework built on the efforts of water conservation during the 2012 through 2016 drought, and the implementation of Governor Brown's California Water Action Plan (first released in 2014 and then updated in 2016). The 2017 Framework outlined a suite of actions that can be implemented under existing authorities; and recommended additional actions, where necessary, that can be implemented with new or expanded authority given by the California State Legislature (Legislature). To that end, the Legislature enacted the 2018 Legislation, which provides complementary authorities and requirements that affect water conservation and drought planning for urban retail water suppliers, agricultural water suppliers, and small water suppliers and rural communities.

One of the four primary goals in Executive Order B-37-16 was to "use water more wisely," and the majority of the new and expanded authorities for urban water use efficiency in the 2018 Legislation relate to achieving that goal, adding a chapter in the California Water Code (WC), Chapter 9 (commencing with WC Section 10609) of Part 2.55 of Division 6. As such, DWR engaged stakeholders and coordinated with the State Water Board to conduct necessary studies and investigations to develop

recommendations and other actions required by the 2018 Legislation. Note that the 2018 Legislation does not change existing implementation of the Water Conservation Act of 2019 (also known as SB X7-7, commencing with WC Section 10608); the statewide goal of a 20 percent reduction in urban per capita water use by 2020, compared to baseline calculated in 2010, is still in place and water use by individual customers is not limited directly during the implementation.

In April 2019, Governor Newsom directed State agencies through Executive Order N-10-19 to develop a "water resilience portfolio," described as a set of actions to meet California's water needs through the 21st century. Among others, driving greater water use efficiency in all sectors is one of the major actions in the resulting California Water Resilience Portfolio (CNRA, CalEPA, and CDFA, 2020) for State agencies to support supply diversification and improve drought resilience. For urban water use efficiency, this portfolio action focuses on implementation of the 2018 Legislation with additional funding, supplemental program actions, consistent communication and education, and additional policy support. The intended outcome of these actions is to further extend the beneficial use of limited water supply.

Supporting the continued implementation of the 2018 Legislation, two subsequent legislative amendments to the 2018 Legislation relevant to urban water use efficiency standards, variances, and performance measures included AB 1414 (Friedman) of 2019 and SB 1157 (Hertzberg) of 2022:

- AB 1414 amends and streamlines the scheduled requirements for urban retail water suppliers' Annual Water Use Report and annual water loss audit report. With the amendments, urban retail water suppliers are required to submit their first Annual Water Use Report by January 1, 2024, rather than the original November 1, 2023 date, and subsequent reports by January 1 thereafter.

- SB 1157 adopts the recommendations by DWR and the State Water Board for urban retail water suppliers to achieve an indoor residential water use of 55 gallons per capita per day by 2023, declining to 47 gallons per day by 2025, and 42 gallons by 2030 and beyond.

Relevant implications for these amendments will be discussed when appropriate in this report for context and completeness.

The State began experiencing another severe drought in 2019, only three years after the 2012 to 2016 drought. Consequently, primary State agencies responsible for implementing the California Water Resilience Portfolio issued a 2022 report, *California Water Supply Strategy: Adapting to a Hotter, Drier Future* (CNRA et al., 2022), which details the significant investments to modernize water infrastructure and management that have been made since the portfolio was released, including those for improving urban water use efficiency. The report also addresses investments planned for the

future to advance the water resilience porfolio and the anticipated outcome for securing the future of the State's water supply. Freeing up 500,000 acre-feet of water by 2030 through more efficient water use and conservation – largely implemented through the 2018 Legislation and new standards recommended by DWR (discussed in later sections of this report) – was among the strategies to help make up for water supply lost due to climate change (CNRA et al., 2022).

1.2 Purpose of the Report

Per legislative requirements and with stakeholder engagement, DWR conducted studies and investigations to develop recommendations for urban water use efficiency standards, variances, and performance measures for adoption by the State Water Board. This summary report, *Recommendations for Urban Water Use Efficiency Standards, Variances, Performance Measures, and Annual Water Use Reporting* (WUES-DWR-2021-01A), provides a comprehensive description of DWR's roles and responsibilities for the development of the recommendations, its approach to meeting the requirements of the 2018 Legislation, and the resulting recommendations to be transmitted to the State Water Board for adoption.

In addition, this report summarizes the streamlined and integrated implementation of DWR's recommended water use efficiency standards, variances, and performance measures, and associated reporting requirements for urban retail water suppliers' respective Annual Water Use Reports. DWR will develop a template for the Annual Water Use Report with adequate guidance subsequent to the State Water Board's adoption of the associated regulation.

1.3 Report Organization

This report is organized into six sections:

- **Section 1 – Introduction** provides background information, the purpose of this report, and report organization.
- **Section 2 – New Approach to Urban Water Use Efficiency** provides the legislative requirements for urban water use efficient standards, variances and performance measures, and DWR's role and responsibilities for developing these recommendations.
- **Section 3 – Approach to Develop the Urban Water Use Efficiency Recommendation Package** provides the technical approach, process, and rationales for defining the scope of standards, variances, and performance measures development, and the stakeholder engagement that DWR conducted to support its Urban Water Use Efficiency Recommendation Package

(Recommendation Package) for transmittal to the State Water Board for adoption.

- **Section 4 – Recommendations** summarizes DWR's recommendations for standards, variances, performance measures, and guidelines, and methodologies for calculating the urban water use objective (UWUO).
- **Section 5 – Annual Water Use Report** provides requirements for Annual Water Use Report filing, including specifications.
- **Section 6 – Glossary** provides a list of key terms and their definitions used in this report.
- **Section 7 – References** provides a list of references used in this document.

This report includes one appendix:

- **Appendix A** provides the list of documents in DWR's Recommendation Package that are incorporated by reference.

2.0 A New Approach to Urban Water Use Efficiency

Among other things, the 2018 Legislation contains provisions for advancing urban water use efficiency through developing and implementing various water use efficiency standards, variances, and performance measures per WC Section 10609. This new water conservation framework is different than SB X7-7, which was established in 2009. The focus of SB X7-7 was to reduce statewide urban water use by 20 percent in 2020 compared to baseline calculated in 2010.

This section provides a summary of the new approach to urban water use efficiency outlined in the 2018 Legislation, and DWR's roles and responsibilities for making recommendations for urban water use efficiency standards, variances, and performance measures for the State Water Board's adoption.

2.1 Standard-Based Urban Water Use Efficiency Management

The most significant change in State policy for management and continued improvement of urban water use efficiency is that the 2018 Legislation requires a bottom-up estimate from urban retail water suppliers of their UWUO based on the aggregated efficient water use volume by considering four urban water use efficiency standards and appropriate variances. The four standards are:

- Indoor Residential Water Use Efficiency Standard (IRWUS).
- Outdoor Residential Water Use Efficiency Standard (ORWUS).
- Commercial, Industrial, and Institutional Outdoor Irrigation of Landscape Areas with Dedicated Irrigation Meters Water Use Efficiency Standard (CII-DIMWUS).
- Water Loss Standard (WLS).

Commercial, industrial, and institutional (CII) water use not associated with dedicated irrigation meters (DIM) (or equivalent technologies) for outdoor irrigation of landscape areas is excluded from the UWUO, and subject to requirements of performance measures for CII water use with further exclusion of process water.

Each of the procedural requirements to formalize these four standards for implementation is different. The 2018 Legislation includes a default, progressively reduced IRWUS (WC Section 10609.4(a)). In November 2021, in collaboration with the State Water Board, DWR submitted the joint recommendations for IRWUS to the

Legislature for further consideration, per WC Section 10609.4(b). Separately, the State Water Board is currently conducting a rulemaking process to adopt the proposed WLS, which was originally authorized by SB 555 of 2015. For ORWUS and CII-DIMWUS, the 2018 Legislation requires DWR, in coordination with the State Water Board, to conduct necessary studies and investigations and develop recommendations to the State Water Board by October 1, 2021 (WC Sections 10609.6 and 10609.8).

Another major difference between the SB X7-7 requirements and those of the 2018 Legislation, in addition to the 20 percent reduction in 2020 compared to baseline calculated in 2010, is that the anticipated outcome was measured on a statewide level per SB X7-7 and on an individual urban retail water supplier level per the 2018 Legislation. Recognizing the diversity of water use to support local economic, social, and environmental needs and varying climate conditions in the State, the 2018 Legislation requires DWR, in coordination with the State Water Board, to conduct necessary studies and investigations. It also requires DWR to develop recommendations for adoption by the State Water Board by October 1, 2021, for appropriate variances for unique uses that can have a material effect on an urban retail water supplier's UWUO and the corresponding thresholds of significance (WC Section 10609.14). In this context, DWR interpreted that a material effect means that this unique water use, although used in an efficient manner, when not excluded from an urban retail water supplier's UWUO, could unfairly jeopardize the ability of an urban retail water supplier to comply with the UWUO calculated using the standards adopted per the 2018 Legislation.

As a supporting recommendation, the 2018 Legislation requires DWR to develop accompanying guidelines and methodologies for calculating the UWUO (WC Section 10609.16) and provide the recommendation to the State Water Board for adoption, along with DWR's recommendations on ORWUS, CII-DIMWUS, and appropriate variances by June 30, 2022 (WC Section 10609.2). The 2018 Legislation further requires DWR and the State Water Board to solicit broad public participation throughout the development and adoption processes (WC Section 10609(b)(3)).

Not all urban water uses are included in the UWUO. The 2018 Legislation includes considerations to manage CII water use separately, because CII water use can be complex and diverse and have direct connections to economic productivity. Additionally, there is currently insufficient information available to properly set standards or variances for CII water use, if even feasible, as there is for other categories of urban water use (e.g., indoor residential, outdoor residential). However, progress should still be made to improve CII water use efficiency. Therefore, the 2018 Legislation requires that DWR develop recommendations on performance measures for CII water use other than water use for CII outdoor irrigation of landscape areas measured by commercial, industrial, and institutional dedicated irrigation meters (CII-DIM) (or equivalent technologies) (already included as one of the standards) and process water (excluded from both the UWUO and CII water use performance measures).

This performance measure approach for CII water use in the 2018 Legislation is different from the previous SB X7-7 requirements. The SB X7-7 water conservation framework required urban retail water suppliers to set conservation targets in gallons per capita per day (gpcd) and accounted for CII water use in a lumped reduction format with process water excluded. However, reporting CII water use in gpcd could be misleading, because CII water use may not have a direct correlation to the number of permanent residents in the service area. Reporting CII water use in gpcd or other metrics without the context of associated economic activities is not effective for showing progress in increased CII water use efficiency; efficient water uses of similar or different CII-related economic activities can vary significantly in volume depending on a number of factors. Therefore, urban retail water suppliers are often required to provide additional justification or descriptions for CII water use efficiency that cannot be demonstrated by using gpcd statistics or other metrics, including factors that may hinder the anticipated progress, such as lack of authority to unilaterally implement improvements or best management practices (BMP) without explicit cooperation of CII water users.

Under the 2018 Legislation, urban retail water suppliers are not required to report the volume of CII water use, except for the outdoor irrigation water use under CII-DIMWUS. However, urban retail water suppliers are required to report the performance measures in their Annual Water Use Report, including the actions they take to improve CII water use efficiency and associated outcomes. This more granular approach to improving CII water use efficiency is consistent with the approach to the volumetric reporting requirements under the UWUO and provides an opportunity for understanding the causations between performance measure actions and resulting water use efficiency improvements.

2.2 California Department of Water Resources' Roles and Responsibilities to Make Recommendations

Chapter 9 of the WC establishes a method to estimate the aggregate amount of water that would have been delivered the previous year by an urban retail water supplier if the total amount of that water had been used efficiently. This estimated aggregate water use is the urban retail water supplier's UWUO. The method is based on water use efficiency standards and local service area characteristics for that year. By comparing the amount of water actually used in the previous year with the UWUO, urban retail water suppliers will be in a better position to help eliminate the unnecessary use of water; that is, water used in excess of that needed to accomplish the intended beneficial use.

The 2018 Legislation requires DWR, in coordination with the State Water Board, to conduct necessary studies and investigations and develop recommendations to the

State Water Board on efficiency standards for outdoor residential water use, outdoor irrigation of landscape areas with DIMs (or equivalent technologies) or other means of measurements, water loss, variances, and performance measures for CII water use for consideration in the regulation adopted by the State Water Board.

Areas of Recommendation

The 2018 Legislation requires DWR to recommend, no later than October 1, 2021, guidelines and methodologies for the State Water Board to adopt that identify how an urban retail water supplier calculates its UWUO (WC Section 10609.16). The 2018 Legislation also requires DWR to conduct necessary studies to recommend guidelines and methodologies to calculate different components of the UWUO.

DWR developed the recommendations on urban water use efficiency standards, variances, performance measures, and Annual Water Use Report per legislative directive. The resulting recommendations submitted to the State Water Board for adoption do not set, rescind, or modify existing or future requirements for urban water use efficiency unless in areas where explicitly stated. In addition, DWR's recommendations do not restrict urban retail water suppliers from implementing actions to improve their water use efficiency beyond the requirements.

Standard for Indoor Residential Use

The joint IRWUS recommendation was provided by DWR and the State Water Board to the Legislature on November 18, 2021, and was adopted by the Legislature through SB 1157, in September 2022. This report includes IRWUS for completeness and context because it is part of the UWUO calculation.

Standard for Outdoor Residential Use

The 2018 Legislation requires DWR to recommend standards for outdoor residential water use by October 1, 2021, to the State Water Board for adoption (WC Section 10609.6(a)(1)). WC Section 10609.6(a)(2) states:

> […] *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)* (WC Section 10609.6(a)(2)(A)).
>
> *The standards shall apply to irrigable* lands (WC Section 10609.6(a)(2)(B)).
>
> *The standards shall include provisions for swimming pools, spas, and other water features. Ornamental water features that are artificially supplied with water, including ponds, lakes, waterfalls, and fountains, shall*

> *be analyzed separately from swimming pools and spas* (WC Section 10609.6(a)(2)(C)).

Standard for Outdoor Irrigation of Landscape Areas with DIMs or Other Means of Measurement in Connection with CII Water Use

DWR is required to develop recommendations to the State Water Board for adoption of standards for CII outdoor irrigation of landscape areas with DIMs (or equivalent technologies) or other means of measurement by October 1, 2021 (WC Section 10609.8(a)). The standards are to:

> […] *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)* (WC Section 10609.8(b)).
>
> […] *include an exclusion for water for commercial agricultural use meeting the definition of subdivision (b) of Section 51201 of the Government Code* (WC Section 10609.8(c)).

Standard for Water Loss

The 2018 Legislation requires the State Water Board, in coordination with DWR, to adopt WLS, which was previously authorized by SB 555 of 2015 (WC Section 10608.12), by June 30, 2020 (WC Section 10609.2). The State Water Board is currently conducting a separate rulemaking process to adopt the proposed WLS. This report includes WLS for completeness and context because it is part of the UWUO calculation.

Variances for Unique Uses with Material Effect on an Urban Retail Water Supplier's UWUO

The 2018 Legislation requires DWR, in coordination with the State Water Board, to conduct necessary studies and investigations and, no later than October 1, 2021, recommend for adoption by the State Water Board appropriate variances for unique uses that can have a material effect on an urban retail water supplier's UWUO (WC Section 10609.14(a)). Appropriate variances may include, but are not limited to, the following eight identified in WC Section 10609.14(b):

> […] *(1) Significant use of evaporative coolers.*
>
> *(2) Significant populations of horses and other livestock.*
>
> *(3) Significant fluctuations in seasonal populations.*

(4) Significant landscaped areas irrigated with recycled water having high levels of total dissolved solids.

(5) Significant use of water for soil compaction and dust control.

(6) Significant use of water to supplement ponds and lakes to sustain wildlife.

(7) Significant use of water to irrigate vegetation for fire protection.

(8) Significant use of water for commercial or noncommercial agricultural use.

DWR, in recommending variances for adoption by the State Water Board, shall also recommend a threshold of significance for each recommended variance (WC Section 10609.14(c)).

Bonus Incentive for Qualified Direct Potable Reuse

In addition to the above standards and variances, the 2018 Legislature allows an urban retail water supplier to include a bonus incentive based on the potable reuse volume to adjust its UWUO within the legislated criteria and limitations of WC Sections 10609(b)(2)(F) and 10609.20(d)(1). However, specific methodologies and details of volume calculation are needed for consistent implementation. DWR identified the need to provide clarity on the legislative requirements through a detailed description of the legislative criteria for bonus incentive eligibility and a detailed discussion of recommended methodologies for the bonus incentive accounting needed for implementation.

Calculation of the UWUO

The guidelines and methodologies for calculation of the UWUO shall address, as necessary, all of the following (WC Section 10609.16):

(a) Determining the irrigable lands within the urban retail water supplier's service area.

(b) Updating and revising methodologies described pursuant to subparagraph (A) of paragraph (1) of subdivision (h) of Section 10608.20, as appropriate, including methodologies for calculating the population in an urban retail water supplier's service area.

(c) Using landscape area data provided by the department or alternative data.

(d) Incorporating precipitation data and climate data into estimates of a urban retail water supplier's outdoor irrigation budget for its urban water use objective.

(e) Estimating changes in outdoor landscape area and population, and calculating the urban water use objective, for years when updated landscape imagery is not available from the department.

(f) Determining acceptable levels of accuracy for the supporting data, the urban water use objective, and compliance with the urban water use objective.

Performance Measures for CII Water Use

The 2018 Legislation requires DWR to recommend, no later than October 1, 2021, performance measures for CII water use for adoption by the State Water Board. Recommendations of appropriate performance measures for CII water use shall be consistent with *Commercial, Industrial, and Institutional Task Force Water Use Best Management Practices Report to the Legislature* (DWR, 2013a and 2013b), including the technical and financial feasibility recommendations provided in that report, and shall support the economic productivity of California's CII sectors (WC Section 10609.10):

(a) The department, in coordination with the board, shall conduct necessary studies and investigations and recommend, no later than October 1, 2021, performance measures for CII water use for adoption by the board in accordance with this chapter.

(b) Prior to recommending performance measures for CII water use, the department shall solicit broad public participation from stakeholders and other interested persons relating to all of the following:

(1) Recommendations for a CII water use classification system for California that address significant uses of water.

(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.

(3) Recommendations for CII water use best management practices, which may include, but are not limited to, water audits and water management plans for those CII customers that exceed a recommended size, volume of water use, or other threshold.

> *(c) Recommendations of appropriate performance measures for CII water use shall be consistent with the October 21, 2013, report to the Legislature by the Commercial, Industrial, and Institutional Task Force entitled "Water Use Best Management Practices," including the technical and financial feasibility recommendations provided in that report, and shall support the economic productivity of California's commercial, industrial, and institutional sectors.*

Urban Water Use Efficiency Recommendation Package

DWR has completed a significant body of work to meet the requirements of the 2018 Legislation and provide recommendations on urban water use efficiency to the State Water Board for adoption. To streamline document development and recognize the inherent interrelationship among different topics and the need for overall consistency, DWR organized the various reports in the Recommendation Package that allows mutual referencing and incorporates content by reference. All reports in this Recommendation Package are given a serial number in the form of "WUES-DWR-2021-xx." For each report, Appendix A includes the list of documents within the Recommendation Package that are incorporated by reference.

As discussed in Section 1, this report, *Recommendations for Urban Water Use Efficiency Standards, Variances, Performance Measures, and Annual Water Use Reporting* (WUES-DWR-2021-01A), summarizes DWR's efforts and its resulting recommendations to the State Water Board and provides the context of the Recommendation Package and its implementation. Additional summary documents included in DWR's Recommendation Package include *Summary of Recommendations for Variances* (WUES-DWR-2021-04) and *Summary of Recommendations for Performance Measures for Commercial, Industrial, and Institutional Water Use* (WUES-DWR-2021-15) providing a summary of recommendations for CII water use performance measures with coordinated implementation. DWR's guidelines and methodologies for calculating efficient water use are summarized in *Recommendations for Guidelines and Methodologies for Calculating Urban Water Use Objective* (WUES-DWR-2021-01B). The overall stakeholder engagement and public outreach efforts for supporting implementation of provisions for urban water use efficiency in the 2018 Legislation are summarized in *Stakeholder Outreach Summary for Developing Urban Water Use Efficiency Standards, Variances, and Performance Measures* (WUES-DWR-2021-20). Key terms and their definitions used in this report, along with abbreviations and acronyms, are included in *Urban Water Use Efficiency Recommendation Package: Glossary and Abbreviations and Acronyms* (WUES-DWR-2021-21).

3.0 Approach to Develop the Urban Water Use Efficiency Recommendation Package

The 2018 Legislation requires DWR, in coordination with the State Water Board, to conduct necessary studies and investigations to develop recommendations for standards, variances, and performance measures. This legislation also provides general direction for these studies to be refined during the recommendation development process. This section provides an overview of the approach DWR took to develop the Recommendation Package.

Although anchored by common principles, the varying topics contained in the Recommendation Package require specific focus and customized strategies for success. The ways in which these procedures were applied and adapted for the needs of each topic is described in detail in the individual reports that are incorporated by reference (see Appendix A).

3.1 Objectives and Procedures

DWR's primary objectives in developing the Recommendation Package are to meet the legislative requirements and to design standards, variances, and performance measures that are, with reasonable confidence, able to be implemented and result in improved urban water use efficiency. DWR's approach to development of the Recommendation Package was an iterative process in collaboration with stakeholders and the State Water Board, both of which provided input throughout the process to assist DWR in development of the recommendations.

For each topic, DWR began by investigating, collecting, and evaluating available literature, reports, data/information, methodologies, and lessons learned. Shared understanding regarding the current conditions of various urban water use topics was critical for recommendation development. Technical teams and research groups assigned to each topic compiled best available data through research and communication with experts in the field. Research institutes (e.g., University of California Davis, Center for Water Conservation and Energy Efficiency), where needed, conducted complementary studies to support the recommendation development process.

DWR further evaluated legislative requirements against the above-established shared understanding to clarify the appropriate scope and associated focus and principles for developing each of the recommendations. These efforts then informed the design of standards, variances, and performance measures with multiple options for review and

discussion in the water use efficiency working group workshops and public stakeholder meetings (discussed in further detail in Section 3.3). By incorporating stakeholder input, DWR refined the applicable specifications, guidelines, and methodologies; key performance indicators; and data and reporting requirements. DWR's recommendations reflect this iterative approach and take into account technical feasibility, financial considerations, and associated potential economic effects on urban retail water suppliers and CII sectors.

3.2 Principles

Based on the legislative requirements, findings from studies and research, and input from professionals and stakeholders, DWR developed general principles to follow during the development of the Recommendation Package. These principles are listed below. Additional considerations pertinent to specific topics are discussed in Section 3.5.

- Maintain consistency with legisaltive requirements.
- Prioritize actions and requirements that address major water use.
- Institute consistency with exisiting related regulatory requirements and mutual support for coordinated implementation.
- Establish a consistent core approach for each element of urban water use efficiency to reach consistency at the statewide level and to faciliate adaptable implementation per local conditions.
- Promote a programmatic approach for efficiency and effectiveness of implementation through streamlining the requirements and implementation schedule among different elements of urban water use efficiency.
- Incorporate into the final recommendations technical feasibility, financial feasibility, and economic productivity in defining requirements and key performance indicators to assess the ability to implement the recommended actions.
- Recognize various levels of preparedness of urban retail water suppliers to adapt to the new regulatory framework of urban water use efficiency and, accordingly, provide reasonable accommodation to urban retail water suppliers with less capacity and fewer resources.
- Encourage regional implementation through collaboration and coordination among different entities, but maintain individual reporting requirements for accountability purposes.

3.3 Stakeholder Engagement and Public Involvement

WC Section 10609.18 requires DWR and the State Water Board to solicit broad public participation from stakeholders and other interested persons in the development of the standards and the adoption of regulations pursuant to WC Section 10609, Chapter 9. The Legislation requires the State Water Board to hold at least one public meeting before taking any action on any standard or variance recommended by DWR.

Consistent with the legislative directive, DWR used a public process involving diverse stakeholders in the review and development of bonus incentive accounting methodology and data needs. The stakeholder process was part of the larger engagement process to implement the provisions of urban water use efficiency in the 2018 Legislation (see *Stakeholder Outreach Summary for Developing Urban Water Use Efficiency Standards, Variances and Performance Measures* [WUES-DWR-2021-20]).

DWR facilitated two forms of engagement with State agencies, cities, counties, urban retail water suppliers, environmental organizations, professionals, and other stakeholders and interested parties for recommendation development: working group workshops and public stakeholder meetings. DWR established two working groups to assist in implementing the 2018 Legislation, and these groups formed the basis of the stakeholder involvement process for recommendation development. The Water Use Studies (WUS) Working Group was established in July 2019 to inform DWR in developing water use studies for setting up standards, variances, and performance measures. The Standards, Methods, and Performance Measures Working Group was also established at the same time to provide input to DWR on developing the structure and specifications of water use efficiency standards, variances, methodologies, and performance measures. An additional working group, the Landscape Area Measurement Working Group, was formed earlier to work out the associated decisions and protocols for identifying and mapping residential irrigable landscape area data that the 2018 Legislation directed DWR to provide to urban retail water suppliers. Input from the Landscape Area Measurement Working Group was used in the studies and investigations for recommending outdoor water use efficiency standards.

Working group workshops allowed DWR to engage working group members in discussions to inform specific topics or questions associated with the topic of interest. They also provided opportunities for breakout discussions to promote interactions among working group members and DWR to improve shared understanding and specific details that warranted additional discussions. For efficiency and inclusiveness, DWR provided stakeholders, interested parties, and the public multiple opportunities to participate in these workshops for timely input. Working group members and other participants also had ample opportunities to learn about and review the outcomes of various studies and options considered for recommendation and provide feedback on

these topics. They also provided input on resource and staffing needs and other implementation considerations.

DWR held additional public stakeholder meetings to provide a forum to engage with the public to review ongoing research and analyses that informed recommendation development, present key findings identified and discussed during the working group workshops, and solicit additional input related to ongoing studies, investigation, and resulting findings and recommendations.

Overall, from early 2019 to January 2022, DWR held five public meetings and working group workshops for IRWUS, 13 for ORWUS and related landscape area measurements, seven for variances, and eight for CII water use performance measures. Additional surveys and individual meetings with urban retail water suppliers and interested parties were also conducted as needed. To assist the technical studies and investigations required by the 2018 Legislation, DWR held many topic-specific discussions with experts in the industry and experienced urban retail water suppliers to inform the recommendation development.

DWR also conducted and responded to requests for additional meetings and public outreach and engagement activities with both individual entities and groups of stakeholders to learn from their experiences, understand their specific concerns, and receive other feedback. For the development of individual variances, DWR also met with representatives from various organizations (e.g., urban retail water suppliers, stakeholders, industries, academic institutions) to gather information and data, discuss potential approaches, and receive feedback.

Refer to *Stakeholder Outreach Summary for Developing Urban Water Use Efficiency Standards, Variances, and Performance Measures* (WUES-DWR-2021-20) for additional details related to the stakeholder engagement process. Stakeholder outreach activities that are pertinent to specific topics of urban water use efficiency are addressed in topic-specific recommendation reports and incorporated in this report by reference.

3.4 State Agency Coordination

The recommended urban water use efficiency standards, variances, and performance measures are subject to the State Water Board's adoption and potentially involve other State agencies in implementation.

Coordination and Collaboration with the State Water Resources Control Board

As directed in the 2018 Legislation, DWR coordinated with the State Water Board on development of standards, and recommended variances, performance measures, and guidelines and methodologies for calculating the UWUO. DWR also collaborated with the State Water Board to provide a joint recommendation on IRWUS defined in the statute. State Water Board representatives participated in the WUS working group

workshops and public stakeholder meetings listed above. DWR also held regular coordination meetings and periodic briefings with State Water Board staff related to the Recommendation Package development.

DWR and the State Water Board recognized the importance of continued coordination and collaboration to ensure the effective implementation of AB 1668 and SB 606 and to streamline the efforts. Staff and leadership from the two agencies met via Microsoft Teams meetings monthly. Topic-specific subgroups also met, as needed; some as often as weekly. Incremental conclusions and recommended actions from these subgroups were brought back to the agency level for further consideration. With respect to improving urban water use efficiency, the efforts of the two agencies were complementary, and built upon each other to establish sufficient mutual understanding about the findings from the body of work and rationales to support DWR's recommendations. Refer to *Stakeholder Outreach Summary for Developing Urban Water Use Efficiency Standards, Variances, and Performance Measures* (WUES-DWR-2021-20) for additional details on coordination with the State Water Board.

Other State Agencies

Depending on the nature of a specific subject, DWR reached out to other State agencies, including CPUC, CDFA, and CEC, to discuss potential options for consideration and review the best available practices related to each topic. These three agencies were part of the team with DWR and the State Water Board in developing the 2017 Framework, informing the 2018 Legislation – and could have certain administrative responsibilities and management involvement for implementing the recommendations after adoption.

3.5 Topic-Specific Elements of Approach to Recommendation Development

In addition to the general approach described in previous subsections, DWR incorporated essential topic-specific elements into the approach to developing the corresponding recommendations. Refer to the topic-specific recommendation reports for additional information.

Standards

In the context of the 2018 Legislation, the four water use efficiency standards cover those types of water use commonly shared by most, if not all, urban retail water suppliers, regardless of geographic location, local climate, or other urban retail water supplier–specific conditions. Therefore, the scope of each water use efficiency standard addresses the water use that is shared among the majority or all urban retail water suppliers. The following provides a summary of specific considerations DWR incorporated into the development of its recommendations.

IRWUS

As previously mentioned, IRWUS is not part of DWR's Recommendation Package to the State Water Board for adoption per the 2018 Legislation. The following is provided for context and completeness, because IRWUS is part of the UWUO.

IRWUS is a water use efficiency standard for calculating the aggregate amount of efficient water use for indoor residential water consumption in an urban retail water supplier's service area and incorporates considerations of local conditions. IRWUS was independent of the other standards in that the study of indoor residential water use directed by the 2018 Legislation was to include the information necessary to determine if a recommendation for indoor residential water use was needed. If so, DWR, in coordination with the State Water Board, were to jointly recommend to the Legislature a standard that more appropriately reflected best practices for indoor residential water use than the standard described in WC Section 10609.4(a) (WC Section 10609(b)(1)). Accordingly, DWR completed the necessary study with a robust study plan and conducted research with assistance from water use experts to identify the then-current statewide average per capita indoor residential water use and projections for 2025 and 2030. DWR and the State Water Board submitted a report to the Legislature on November 18, 2021, recommending that urban retail water suppliers achieve an indoor water use efficiency standard of 55 gallons per capita per day by 2023, declining to 47 gallons per day by 2025, and 42 gallons by 2030 and beyond (DWR, 2021).

ORWUS

The 2018 Legislation requires DWR, in coordination with the State Water Board, to develop ORWUS that incorporates the principles of Model Water Efficient Landscape Ordinance (MWELO) and applies to irrigable lands (WC Section 10609.6(2)(B)). Additionally, WC Section 10609.16(c) requires DWR to provide residential landscape area measurement data to urban retail water suppliers for calculating their UWUOs.

DWR recognized that irrigable lands comprise irrigable-irrigated (II) and irrigable-not-irrigated (INI) lands. DWR further recognized that the standard would need to incorporate considerations of these two metrics to present a fair and reasonable approach and the intention for promoting efficient water use for residential outdoor irrigation use. In addition, the ORWUS is in part based on the horticultural science, which is described in detail in *Recommendations for Outdoor Residential Water Use Efficiency Standard* (WUES-DWR-2021-02), and the supporting document, *Landscape Area Measurements Final Project, Report EA-133C-16-CQ-0044* (WUES-DWR-2021-02.T1).

During the ORWUS development process, DWR decided that the recommended ORWUS would not include Special Landscape Areas (SLA), because the study was not able to distinguish SLAs from regular residential landscape areas with the available data. However, under the recommended ORWUS, urban retail water suppliers with

residential DIMs (or equivalent technologies) that wish to incorporate SLAs were directed to report this water use under CII-DIMWUS, at the discretion of the urban retail water supplier.

CII-DIMWUS

Per the 2018 Legislation, DWR developed CII-DIMWUS with incorporation of the principles of MWELO and exclusion of water used for commercial agriculture (WC Section 10609.8). CII water use is defined by WC Section 10608.12(d), and large landscapes associated with CII water use are defined in WC Section 10608.12(l):

> *"CII water use" means water used by commercial water users, industrial water users, institutional water users, and large landscape water users.*
>
> *"Large landscape" means a nonresidential landscape as described in the performance measures for CII water use adopted pursuant to Section 10609.10.*

DWR developed CII-DIMWUS using a similar approach to ORWUS development, but recognized and addressed the necessary differences in landscape management between residential and CII landscapes. For that reason, DWR conducted a literature review and engaged with urban retail water suppliers and CII landscape management experts to evaluate efficient CII landscape water use as the basis for the CII-DIMWUS approach.

Unlike ORWUS, information pertaining to the landscape areas, plant types, and irrigation water used on all landscapes was not available for CII landscapes. However, as directed by legislation, water requirements for plants used in CII landscapes must adhere to the same principles of MWELO as the recommended ORWUS and water requirements for plants used in CII landscapes; and they must adhere to the same horticultural science used to develop the recommended ORWUS.

CII landscapes, like residential landscapes, have the same local climate, plant water needs, and reference evapotranspiration rate. This means that CII-DIMWUS could be informed by the results of the ORWUS study and in combination with the data and experiences shared by urban retail water suppliers, CII landscape managers, and the principles of MWELO. All irrigated CII landscape areas served by a DIM (or equivalent technology) will have to be individually measured. However, CII landscapes are either irrigated or not irrigated; therefore there is no INI component in the recommended CII-DIMWUS.

WLS

As previously mentioned, WLS is not part of the Recommendation Package to the State Water Board for adoption per the 2018 Legislation. The following is provided for context and completeness, because WLS is part of the UWUO.

The State Water Board's rulemaking for WLS started in December 2021, and the proposed WLS for each urban retail water supplier is based on a set of defined economic model calculations, with opportunities for urban retail water suppliers to submit requests for parameter adjustments due to local conditions. It also contains provisions for variances due to unexpected adverse conditions out of the urban retail water supplier's control or when its WLS was set to baseline conditions due to an unfavorable net benefit.

Variances

While the water use efficiency standards, discussed above, address the types of water use commonly shared by most, if not all, urban retail water suppliers, variances are effectively the less common uses that may be important for only some urban retail water suppliers due to geographic location, local climate, and other local conditions. As such, while variances may be closely related to standards, they are specifically intended to address unique water uses that are not commonly shared by urban retail water suppliers statewide, but that could have a material effect on an urban retail water supplier's UWUO. On the other hand, scope of the standards and CII water use performance measures could also affect the variance recommendations. Therefore, DWR approached variance development with a full perspective for consistency among the concurrent efforts for developing standards, variances, and performance measures. Similar to the development of the standards, DWR clarified the scope of each variance through studies, research, and feedback from the collaborative process with stakeholders and the State Water Board.

The 2018 Legislation identified eight potential variances for considerations. DWR solicited input from working group members and stakeholders for potential others and varying scenarios that should be considered for a variance. DWR examined different scenarios associated with any water use against three questions in sequence prior to developing variance recommendations:

1. Is this water use out of the scope for the UWUO? In other words, is this water for non-urban use or part of the CII water uses other than irrigating landscapes with DIMs? If so, the water use is either not subject to the provisions of urban water use efficiency in the 2018 Legislation or excluded from the UWUO and, thus, there is no need for a variance.

2. Is this water use unique in the context of the UWUO? If no, it is not eligible. If yes, the water use is potentially eligible for a variance and the following two questions need to be answered "yes" to be determined eligible:

    - Is this water use shared by only some urban retail water suppliers or needed in unusual circumstances, but not commonly used enough to be included in one of the standards?

    - Is this water use excluded from all urban water use efficiency standards and other variances?

3. Could this unique water use have a material effect on the UWUO of some urban retail water suppliers? If yes, the water use is warranted for variance development.

DWR analyzed all potential variance candidates identified by the 2018 Legislation and by stakeholders to identify a clarified scope for variance development, if warranted. DWR eliminated certain variance candidates from further consideration because: (1) the subject water use is either covered by a standard or can be avoided by changing existing practices that have been in place for convenience or other similar reasons, or (2) it would be more appropriate for the subject water use to be redirected and included in a standard as a special condition (e.g., designed as an SLA).

Given that variances are, like the water use efficiency standards, important components of the Recommendation Package, DWR applied a similar vigor to formulating the associated thresholds of significance and methods of calculating the aggregated water use volume for its variance recommendations. Notwithstanding, since every variance is unique, DWR acknowledged that the required data and methodologies could also require unique considerations. During the development process, many urban retail water suppliers expressed concerns over the potential burden and costs to pursue a variance in addition to compliance with many other requirements under the provisions of urban water use efficiency in the 2018 Legislation. Therefore, DWR determined that recommended variances and their associated methodologies should, to the extent possible, be consistent with the existing water use efficiency regulations, or should build on methodologies used by urban retail water suppliers in SB X7-7 compliance or related regulations (e.g., inclusion of MWELO principles consistent with ORWUS and CII-DIMWUS).

DWR recognized that not all urban retail water suppliers have the capacity to acquire and access water use data with high temporal and geographical resolutions. Where appropriate, DWR included different thresholds of significance to accommodate the varying abilities of urban retail water suppliers in accessing data with high resolutions of water use. Certain variances require more advanced detection methodologies (e.g., for identification of seasonal populations); thus, DWR included potential technical

assistantship, tools, and trainings to support urban retail water supplier in the implementation process.

DWR emphasized the important procedural requirement associated with variances. When a recommended variance is adopted by the State Water Board, the variance becomes available to urban retail water suppliers. However, before a variance can be included in an urban retail water supplier's UWUO, the urban retail water supplier is required to request the use of the variance, with supporting data, and receive approval from the State Water Board (WC Section 10609.14(d)). This procedural requirement is urban retail water supplier–specific and variance-specific. The State Water Board is required to post on its website a list of approved variances, the specific variances approved for each urban retail water supplier, and the data requirement supporting the approval of each variance for individual urban retail water suppliers (WC Section 10609.14(e)).

During the variance development process, DWR deferred the further consideration of certain variances until the associated water use is more established. Since additional variance candidates may also be identified in the future, DWR included procedural recommendations for additional variance considerations and development based on current efforts.

Bonus Incentive

To balance the existing State policy encouraging potable water reuse to improve regional self-reliance and water resiliency, the 2018 Legislation allows an urban retail water supplier to include a bonus incentive, based on the potable reuse volume within the legislated criteria and limitations, to adjust its UWUO (WC sections 10609(b)(2)(F) and 10609.20(d)(1)). The legislation sets a clear and specific scope for the application of the bonus incentive. Therefore, DWR focused on developing the methodology for volume calculation that is needed for consistent implementation.

Incorporating input from working group members and stakeholders, DWR's objectives for the bonus incentive accounting methodology was that it must be consistent with the legislative requirements and limitations on specific uses, and it must be clear and feasible. Clarity refers to a lack of ambiguity in the requested input data and calculations used to derive the bonus incentive volume for reporting purposes. Feasibility refers to the reasonable accessibility of the input data needed for the urban retail water suppliers. To the extent possible, DWR developed the accounting method by leveraging the methodologies that are currently used for SB X7-7 compliance purposes with necessary modifications for intended purposes and consistency with legislative requirements.

Commercial, Industrial, and Institutional Water Use Performance Measures

Due to the recognized complexity and diversity in CII water use and necessity of maintaining economic productivity, water use efficiency in the CII sectors is not

assessed based on established standards or quantification of water use. In addition, except for landscape irrigation with DIMs (or equivalent technologies) which is subject to CII-DIMWUS, CII water use is not part of the UWUO that urban retail water suppliers need to report on quantitively in their corresponding Annual Water Use Reports; water use efficiency in CII sectors is instead addressed through implementation of CII water use performance measures and, therefore, subject to compliance with performance measures. As such, CII water use performance measures recommended by DWR as part of the Recommendation Package do not require urban retail water users to report quantitively on CII water use, on CII water use efficiency, or on the amount of water savings as a whole or by sector (i.e., classification) as part of their Annual Water Use Report.

Per WC Section 10608.12(n), peformance measures are actions taken by urban retail water suppliers that will result in increased water use efficiency by CII water users (and do not include process water). However, urban retail water suppliers have limited authority to unilaterally implement certain actions that may affect how water use occurs on properties of CII water users. Therefore, consistent with the legislative requirements, DWR considered that CII water use performance measures should focus on actions that the urban retail water supplier can unilaterally take to either implement processes or procedures to improve landscape water use efficiency or to assist, encourage, or incentivize actions by CII water users, property managers, or property owners for improving CII water use efficiency.

DWR conformed with WC Section 10609.10 by conducting the following key studies and research to facilitate recommendation development:

- Identify a CII water use classification system for data collection and reporting purposes.
- Assess applicable commercial, industrial, and institutional water use best management practices (CII-BMP) for implementation.
- Identify the threshold and schedule for implementation of CII-BMPs.
- Inform the recommendation for a minimum size threshold for converting mixed-use meters to DIMs (or equivalent technologies).
- Identify acceptable technologies to be implemented in lieu of converting mixed-use meters to DIMs (or equivalent technologies).

In addition to necessary technical detail and implementation considerations, the interconnection among various CII water use performance measures required an overall design for mutual support, and a coordinated and streamlined implementation as part of the recommendations. Consequently, DWR used a coordinated and consistent

approach to develop the CII water use performance measures, with incorporation of legislative requirements for stakeholder engagement and coordination with the State Water Board during the process.

4.0 Recommendations

Per the 2018 Legislation, DWR developed recommendations for ORWUS, CII-DIMWUS, variances and their thresholds of significance, CII water use performance measures, guidelines, and methodologies for calculating the urban retail water suppliers' UWUO. This section provides a summary of these recommendations with implementation considerations; additional details are provided in the individual, topic-specific recommendation reports that are part of the Recommendation Package and incorporated by reference.

4.1 Summary of Recommendations

Indoor Residential Water Use Efficiency Standard

IRWUS was originally set in the 2018 Legislation in WC Section 10609.4 with a progressive schedule shown in Table 4-1. Per the directive of the 2018 Legislation, DWR and the State Water Board made recommendations to amend the original legislative standard based on the findings of studies and investigations; these recommendations were later approved by the Legislature through SB 1157. As previously mentioned, the recommendations for IRWUS are not part of the Recommendation Package, but included for completeness and context, because efficient indoor residential water use is part of the UWUO. Urban retail water suppliers need to use the amended standard for their UWUO calculation.

Table 4-1 Indoor Residential Water Use Efficiency Standard

Effective Period	IRWUS in the 2018 Legislation (gpcd)	IRWUS Amended by SB 1157 (gpcd)
Through December 31, 2024	55.0	55.0
January 1, 2025, through December 31, 2029	52.5	47.0
Starting from January 1, 2030	50.0	42.0

Key:
gpcd = gallons per capita per day
IRWUS = Indoor Residential Water Use Efficiency Standard
SB = Senate Bill

Outdoor Residential Water Use Efficiency Standard

DWR recommends ORWUS as follows:

1. **Existing Residential Landscapes**. DWR recommends an ORWUS of 0.80 in 2023, transitioning to an ORWUS of 0.63 in 2030 and beyond. Existing residential landscapes refer to landscapes installed during, or prior to, the year the imagery processed in the landscape area measurements for the

recommendation development was acquired (2018 for most urban retail water suppliers).

This phase-in approach is intended to provide a reasonable pathway for urban retail water supplier compliance with these new State water use efficiency standards. Prior to these final recommendations, DWR publicly shared and sought feedback on a draft ORWUS of 0.65 for 2030 and beyond. Taking into consideration applicable legislative requirements and the imperative to achieve reasonably greater long-term water use efficiency for climate resilience, DWR recommends an ORWUS of 0.63 for 2030 and beyond.

2. **New Residential Construction**. DWR recommends an ORWUS of 0.55, or a more efficient standard that may be identified in future MWELO amendments. New residential construction refers to landscapes installed after the year of imagery processed in the landscape area measurements for the recommendation development was acquired (2018 for most urban retail water suppliers).

3. **SLAs in Residential Parcels**. DWR recommends two options for SLAs, such as gardens or play areas with turf:

    a. Including the residential SLAs in the CII-DIM calculations if water is provided via a residential dedicated meter. For calculating the UWUO and for reporting purposes, urban retail water suppliers should classify the residential dedicated meter as a CII-DIM, allowing use of a CII-DIMWUS of 1.0 for SLAs in calculating UWUO consistent with MWELO and DWR's recommendations for CII-DIMWUS.

    b. Including the residential SLAs in the ORWU calculations. DWR recommends an ORWUS of 0.80 in 2023, and transitioning to a lower ORWUS of 0.63 in 2030 and beyond.

4. **Landscape Areas for UWUO Calculation**. DWR recommends applying ORWUS to the sum of 20 percent of INI landscape area and 100 percent of II landscape area for UWUO calculation, with the previously mentioned adjustments, if applied, to account for residential SLAs under CII-DIMWUS. DWR also recommends potential adjustments to the proportion of INI used, if warranted, based on the outcome of additional studies and investigations that DWR recommends be conducted jointly by DWR and the State Water Board.

Refer to *Recommendations for Outdoor Residential Water Use Efficiency Standard* (WUES-DWR-2021-02) for details on recommended specifications, implementation considerations, and reporting requirements for ORWUS.

Water Use Efficiency Standard for CII Outdoor Irrigation of Landscape Areas with Dedicated Irrigation Meters (or Equivalent Technology)

DWR recommends including a definition for equivalent technology within the applicable scope of CII-DIMWUS. Under DWR's recommendation, an "equivalent technology" is defined as any other device or process that is not a DIM that measures the volume of water delivered to the landscape and reports directly to the urban retail water supplier, on the same time interval as service area DIMs and with the same accuracy as service area DIMs, such that it can be used for billing purposes if an urban retail water supplier chooses to do so.

DWR recommends a CII-DIMWUS as follows:

1. **Existing CII Landscapes**. Based on the evaluation of available ORWUS data and limited CII landscape data, DWR recommends a CII-DIM (or equivalent technology) water use efficiency standard of 0.80 for 2023, transitioning to a standard of 0.63 in 2030 and beyond for existing landscapes (similar to the recommended ORWUS), with modifications for SLAs.

2. **New CII Landscapes**. New CII landscape efficient outdoor water use should use a CII-DIM (or equivalent technology) water use efficiency standard of 0.45, or of the value that may be identified in future MWELO amendments, with modification for SLAs. New CII landscape refers to landscapes installed or rehabilitated after January 1, 2020.

3. **Landscape Area Measurement**. The recommended standard would require urban retail water suppliers to identify DIMs and measure the associated irrigated CII landscapes within five years after the State Water Board adopts the regulation.

4. **Additional SLAs**. DWR recommends the following additional SLAs under CII-DIMWUS:

    a. Bioengineered slopes.

    b. Public swimming pools.

    c. Supplemental water for ponds or lakes, including, but not limited to, sustaining wildlife, recreation, or other public benefit. Note that urban retail water suppliers that provide supplemental water to ponds and lakes for sustaining wildlife under specific regulatory requirements should apply for the variance recommended by DWR for this purpose.

5. **Exempt Landscapes**. DWR recommends that landscapes exempt in California Government Code (GC) 65598 and 2015 MWELO also be excluded from the UWUO.

Refer to *Recommendations for Commercial, Industrial, and Institutional Outdoor Irrigation of Landscape Areas with Dedicated Irrigation Meters Water Use Efficiency Standard* (WUES-DWR-2021-03) for details on recommended specifications, implementation considerations, and reporting requirements for CII-DIMWUS.

Variances for Unique Uses of Water

DWR concluded that sufficient evidence supports the establishment of the eight variances identified in the 2018 Legislation; however, two should be refined: "significant use of water for soil compaction and dust control" should be limited to "significant use of water for dust control for horse corrals and animal exercising arenas," and "significant use of water to irrigate vegetation for fire protection" should be modified and expanded to "significant use of water during major emergencies." Therefore, DWR recommends eight variances for unique uses of water, including the following:

- Significant water use of evaporative coolers.
- Significant populations of horses and other livestock.
- Significant fluctuations in seasonal populations.
- Significant landscape areas irrigated with recycled water having high levels of total dissolved solids (TDS).
- Significant use of water for dust control for horse corrals and animal exercising arenas (refined from significant use of water for soil compaction and dust control suggested in the 2018 Legislation).
- Significant use of water to supplement ponds and lakes to sustain wildlife.
- Significant use of water during major emergencies (refined from significant use of water to irrigate vegetation for fire protection suggested in the 2018 Legislation).
- Significant use of water for commercial or noncommercial agricultural use.

A summary of each of these recommended variances is provided later in this section with details in their corresponding topic-specific recommendation reports that are incorporated by reference. DWR also recommends deferring development of the stakeholder-identified potential variance for significant water use of home use medical devices until such a time that use of home medical devices becomes prevalent enough that it could have a material effect on urban retail water suppliers' UWUOs. Refer to

Recommendations for Deferring Variance for Significant Water Use of Home Use Medical Devices (WUES-DWR-2021-06) for additional details.

DWR further recommends the protocols and procedurals to accommodate the needs of future consideration of this potential variance and other variance candidates, building on the experience of the current effort (see *Summary of Recommendations for Variances* [WUES-DWR-2021-04]).

Variance for Significant Water Use of Evaporative Coolers

DWR recommends that a variance be established for significant use of evaporative coolers used in residential properties on parcels with a residential land use designation in local general plans. With necessary approval by the State Water Board, urban retail water suppliers can include this variance in calculation of their UWUO if the variance-specific efficient water use volume is greater than 5 percent of the sum of the aggregated estimates of efficient water uses based on IRWUS, ORWUS, CII-DIMWUS, and WLS.

This recommended variance is against IRWUS. Refer to *Recommendations for Variance for Significant Water Use of Evaporative Coolers, Methods of Calculation, and Supporting Data Requirements* (WUES-DWR-2021-05) for a detailed discussion of this variance.

Variance for Significant Populations of Horses and other Livestock

DWR recommends that a variance be established for significant populations of horses and other livestock on parcels with a residential land use designation in local general plans. With necessary approval by the State Water Board, urban retail water suppliers can include this variance in calculation of their UWUO if the variance-specific efficient water use volume is greater than 5 percent of the sum of the aggregated estimates of efficient water uses based on IRWUS, ORWUS, CII-DIMWUS, and WLS.

This recommended variance is against ORWUS. Refer to *Recommendations for Variance for Significant Populations of Horses and Other Livestock, Methods of Calculation, and Supporting Data Requirements* (WUES-DWR-2021-07) for a detailed discussion of this variance.

Variance for Significant Fluctuations in Seasonal Populations

DWR recommends that a variance be established for significant fluctuations in seasonal populations in residential properties on parcels with a residential land use designation in local general plans. With necessary approval by the State Water Board, urban retail water suppliers can include this variance in calculation of their UWUO if the following conditions are met:

- If an urban retail water supplier implements the standard method for identifying seasonally occupied homes using monthly water bill data, the variance-specific efficient water use volume needs to be greater than 5 percent of the sum of the aggregated estimates of efficient water uses based on IRWUS, ORWUS, CII-DIMWUS, and WLS.

- If an urban retail water supplier implements the detailed method for identifying seasonally occupied homes using hourly/daily advanced metering infrastructure (AMI) water data, the variance-specific efficient water use volume needs to be greater than 1 percent of the sum of the aggregated estimates of efficient water uses based on IRWUS, ORWUS, CII-DIMWUS, and WLS.

- If an urban retail water supplier plans to implement the AMI water data acquisition within two years with adequate supporting evidence for timely implementation, during the transition period when urban retail water suppliers still implement the standard method, the variance-specific efficient water use volume needs to be greater than 3 percent of the sum of the aggregated estimates of efficient water uses based on IRWUS, ORWUS, CII-DIMWUS, and WLS.

DWR also recommends technical assistance, including calculation tools, additional guidance, and training sessions for identification of seasonally occupied homes using the recommended methodologies due to their complexity.

This recommended variance is against IRWUS. Refer to *Recommendations for Variance for Significant Fluctuations in Seasonal Populations, Methods of Calculation, and Supporting Data Requirements* (WUES-DWR-2021-08) for a detailed discussion of this variance.

Variance for Significant Landscape Areas Irrigated with Recycled Water Having High Levels of Total Dissolved Solids

DWR recommends that a variance be established for significant landscape areas irrigated with recycled water having high levels of TDS on parcels with a residential or CII land use designation in local general plans, where the associated water use meets requirements of all applicable law and regulations. DWR also defines recycled water having high levels of TDS whereby the TDS level of recycled water is above 900 milligrams per liter (mg/L). DWR does not recommend any upper limit of TDS for irrigation use as it is guided by plant type and other conditions; however, DWR recommends the variance-specific maximum allowable water use be capped at the volume calculated using a TDS concentration of 1,600 mg/L.

Certain urban retail water suppliers use recycled water on residential parcels with meters that may be classified as residential DIMs. An urban retail water supplier may formally (by changing the meter classification) or informally (for UWUO reporting purposes) re-classify residential or uncategorized DIMs serving non-CII landscapes as a

CII-DIM to use the provisions for SLAs allowable under CII-DIMWUS. Both the water use and irrigated landscape area associated with these re-classified DIMs must be reported under CII-DIMWUS for UWUO calculation and reporting purposes.

With necessary approval by the State Water Board, urban retail water suppliers can include this variance in calculation of their UWUO if the following conditions are met:

- If an urban retail water supplier implements the standard method for evapotranspiration factor (ETF) determination on an urban retail water supplier level, the variance-specific efficient water use volume needs to be greater than 5 percent of the sum of the aggregated estimates of efficient water uses based on IRWUS, ORWUS, CII-DIMWUS, and WLS.

- If an urban retail water supplier implements the detailed method for ETF determination based on plant choices on individual landscape areas, the variance-specific efficient water use volume needs to be greater than 1 percent of the sum of the aggregated estimates of efficient water uses based on IRWUS, ORWUS, CII-DIMWUS, and WLS.

This recommended variance is against ORWUS and CII-DIMWUS. Refer to *Recommendations for Variance for Significant Landscaped Areas Irrigated with Recycled Water Having High Levels of Total Dissolved Solids, Methods of Calculation, and Supporting Data Requirements* (WUES-DWR-2021-09) for a detailed discussion of this variance.

Variance for Significant Use of Water for Dust Control for Horse Corrals and Animal Exercising Arenas

DWR recommends that a variance be established for significant water use for dust control for horse corrals and animal exercising arenas on parcels with a residential land use designation in local general plans. With necessary approval by the State Water Board, urban retail water suppliers can include this variance in calculation of their UWUO if the variance-specific efficient water use volume is greater than 5 percent of the sum of the aggregated estimates of efficient water uses based on IRWUS, ORWUS, CII-DIMWUS, and WLS.

This recommended variance is against ORWUS. Refer to *Recommendations for Variance for Significant Use of Water for Dust Control for Horse Corrals and Animal Exercising Arenas, Methods of Calculation, and Supporting Data Requirements* (WUES-DWR-2021-10) for a detailed discussion of this variance.

Variance for Significant Use of Water to Supplement Ponds and Lakes to Sustain Wildlife

DWR recommends that a variance be established for significant water use to supplement ponds and lakes to sustain wildlife on parcels with a residential or CII land use designation in local general plans when the water use is required by existing regulatory requirements or local ordinances. Due to the focus on regulatory compliance, DWR recommends that, with necessary approval by the State Water Board, urban retail water suppliers can include this variance in calculation of their UWUO if the variance-specific efficient water use volume is greater than 0 percent of the sum of the aggregated estimates of efficient water uses based on IRWUS, ORWUS, CII-DIMWUS, and WLS.

This variance is not applicable to supplemental water use to maintain ponds and lakes per local preference or requirements from a self-governing organization without explicit regulatory requirements. DWR recommends urban retail water suppliers consider reclassifying the water use and installing a separate CII-DIM for this type of use to use the SLA provisions allowable under CII-DIMWUS (see *Recommendations for Commercial, Industrial, and Institutional Outdoor Irrigation of Landscape Areas with Dedicated Irrigation Meters Water Use Efficiency Standard* [WUES-DWR-2021-03]).

This recommended variance is against ORWUS and CII-DIMWUS. Refer to *Recommendations for Variance for Significant Use of Water to Supplement Ponds and Lakes to Sustain Wildlife, Methods of Calculation, and Supporting Data Requirements* (WUES-DWR-2021-11) for a detailed discussion of this variance.

Variance for Significant Use of Water During Major Emergencies

DWR recommends that a variance be established for significant use of water during major emergencies on parcels with a residential or CII land use designation in local general plans served by a residential meter or a CII-DIM. A qualified major emergency needs to satisfy all the following:

- It meets the requirements for emergency in GC Section 8558(b) or the “water shortage emergency” declared by local water agencies (per WC Section 350).
- It is not a drought emergency.
- It meets the event-specific requirements:
  - For wildfire events, a mandatory evacuation has been issued by the county’s Sheriff's Office for communities within the service area of the urban retail water suppliers. Therefore, the attributable period for this variance should be limited by the mandatory evacuation orders and subsequent repopulation orders declared by government officials.

  - For earthquakes, orders to shut down the water transmission system by a county's emergency service office or delineation of damaged areas should be used to determine the qualified period and qualified zone of the major emergency.

As the conditions during major emergencies are out of the control of urban retail water suppliers, DWR recommends administrative processes to receive approval from the State Water Board to either exclude the water use or water loss during major emergencies from the calculation of the UWUO or include the amount "as is" in the UWUO to neutralize the effect.

This variance is against IRWUS, ORWUS, and CII-DIMWUS. Refer to *Recommendations for Variance for Significant Use of Water during Major Emergencies, Methods of Calculation, and Supporting Data Requirements* (WUES-DWR-2021-12) for a detailed discussion of this variance.

DWR recommends a variance for significant use of water in distribution systems during major emergencies with the same specifications and requirements previously mentioned. However, in the current draft, WLS regulations proposed by the State Water Board include a variance that may potentially accommodate DWR's recommendations under the variance for significant use of water during major emergencies when applied to distribution system water loss. DWR recommends the State Water Board include distribution system water loss during major emergencies in the covered scope for the proposed variance under WLS with specifications and requirements recommended by DWR. Should the State Water Board make a different determination, DWR recommends a separate variance for this purpose against WLS. Refer to *Recommendations for Variance for Significant Use of Water during Major Emergencies, Methods of Calculation, and Supporting Data Requirements* (WUES-DWR-2021-12) for additional details.

Variance for Significant Use of Water for Commercial or Noncommercial Agricultural Use

DWR recommends that a variance be established for significant use of water for commercial or noncommercial agricultural use on parcels with a residential land use designation in local general plans and served by a residential meter. DWR further recommends that this variance be applied only when total irrigated agriculture on a residential parcel is greater than 1 acre. The calculation should focus on total irrigated land on residential parcels minus the area that is covered under ORWUS.

With necessary approval by the State Water Board, urban retail water suppliers can include this variance in calculation of their UWUO if the following conditions are met:

- If an urban retail water supplier implements the standard method using regional average parameters for its service area, the variance-specific efficient water use

volume needs to be greater than 5 percent of the sum of the aggregated estimates of efficient water uses based on IRWUS, ORWUS, CII-DIMWUS, and WLS.

- If an urban retail water supplier implements the detailed method based on crop-specific information, the variance-specific efficient water use volume needs to be greater than 1 percent of the sum of the aggregated estimates of efficient water uses based on IRWUS, ORWUS, CII-DIMWUS, and WLS.

This variance is against ORWUS. Refer to *Recommendations for Variance for Significant Use of Water for Commercial or Noncommercial Agricultural Use, Methods of Calculation, and Supporting Data Requirements* (WUES-DWR-2021-13) for a detailed discussion of this variance.

While similar in setting, DWR recommends that urban community gardens in public, commercial, or residential areas should be served by CII-DIMs and water use should be reported under CII-DIMWUS as SLAs. DWR also recommends that agricultural use of water on residential parcels that are supplied from a recycled water source be reported under CII-DIMWUS for UWUO accounting purposes in order to use the relevant SLA provisions. Refer to *Recommendations for Commercial, Industrial, and Institutional Outdoor Irrigation of Landscape Areas with Dedicated Irrigation Meters Water Use Efficiency Standard* (WUES-DWR-2021-03) for additional details.

Future Variance Considerations

DWR recommends that urban retail water suppliers, stakeholders, and other interested parties bring forth potential future variances for consideration. DWR further recommends the following protocols and procedures to accommodate the needs of future variance candidates, building on the experience of the current effort.

Preliminary scoping information that supports the potential future variance – unique use, material effects, use of variance, and limitations – should be included in the request for consideration. DWR, in coordination with the State Water Board, will consider potential future variances on an as-submitted basis. Accordingly, DWR will conduct necessary studies and investigations to recommend for adoption by the State Water Board if the proposed variances are for unique uses of water and can have a material effect on an urban retail water supplier's UWUO. Similar to the process used to develop the variance recommendations included herein, DWR would conduct an adequate stakeholder process, in coordination with the State Water Board, throughout the process. The process for the State Water Board's consideration for adoption would be the same as described in WC Section 10609.14(e).

Refer to *Summary of Recommendations for Variances* (WUES-DWR-2021-04) for more details on the recommended protocols and procedures with additional implementation considerations that the State Water Board may address in its rulemaking process.

Bonus Incentive, Methods of Calculation, and Supporting Data Requirements

Potable reuse can be implemented in two different forms: direct potable reuse (DPR), in which recycled water is provided directly to end uses, and indirect potable reuse (IPR), in which recycled water is discharged into an environmental buffer for further diversion or extraction for use, along with other sources of water present in the environmental buffer. Environmental buffers can be a surface water storage or groundwater aquifer, resulting in different needs in accounting methodologies.

DWR recommends an accounting procedure for bonus incentive when applied to IPR that allows yearly reconciliation of accounting in environmental buffers that is consistent with existing implementation for SB X7-7 reporting and compliance. The methodology uses delivered amounts of potable recycled water to qualified end uses that implicitly include consideration of system losses without unnecessary complexity in accounting.

DWR recommends deferring the methodology associated with calculating a bonus incentive for DPR until the State Water Board adopts criteria and regulations for DPR permitting requirements per AB 574 of 2017. Until these criteria and regulations are adopted, DPR is not permitted.

Refer to *Recommendations for Bonus Incentive, Methods of Calculation, and Supporting Data Requirements* (WUES-DWR-2021-14) for details on recommended methods of calculation and reporting requirements for bonus incentive.

Guidelines and Methodologies for Calculating the Urban Water Use Objective

DWR recommends guidelines and methodologies for calculating the UWUO as outlined below. The comprehensive guidelines and methodologies are contained in the full recommendation report (see *Recommendations for Guidelines and Methodologies for Calculating Urban Water Use Objective* [WUES-DWR-2021-01B]).

- Calculation of the four efficient water use components that are subject to the following standards, including all the applicable conditions and requirements:
  - IRWUS.
  - ORWUS.
  - CII-DIMWUS.
  - WLS (If the State Water Board adopts a different methodology for calculating efficient distribution system water loss, the State Water Board method for WLS will supersede DWR's WLS method recommended as part of the guidelines and methodologies for calculating the UWUO based on the draft proposed regulations in 2021).

- Calculation of variances for unique uses of water that could have a material effect on an urban retail water supplier's UWUO.
- Calculation of the UWUO based on the water use efficiency standards (compliance with the efficiency standards is based on the overall objective and not the individual standards it comprises) and variances.
  - Calculation of potable reuse water bonus incentive.
  - Determination of prior year actual water use.
  - Data accuracy requirements and process for using alternative data.
  - Comparison of the actual water use to the UWUO.
- Compliance with 2020 SB X7-7 targets:
  - Urban retail water suppliers are required to comply with their SB X7-7 targets and must maintain their water use below these targets in the future as the State transitions to UWUOs based on water use efficiency standards.
  - Urban retail water suppliers that do not meet their 2020 SB X7-7 targets must come into compliance with these targets as well as their UWUO. DWR recommends that for urban retail water suppliers that their calculated UWUOs plus their "excluded demands" (such as CII indoor water use and CII outdoor water use not connected to a dedicated landscape meter; see WC Section 10609.2(d)) exceed their 2020 targets, the State Water Board adjust components of their UWUOs to prevent backsliding from their 2020 SB X7-7 targets.

Refer to *Recommendations for Guidelines and Methodologies for Calculating Urban Water Use Objective* (WUES-DWR-2021-01B) for details on recommended guidelines and methodologies, data requirements, and other specifications for calculating the UWUO.

Commercial, Industrial, and Institutional Water Use Performance Measures

DWR recommends the following four CII water use performance measures for adoption by the State Water Board and each is summarized later in this section:

- Commercial, Industrial, and Institutional Water Use Classification System Performance Measure (CII Classification System PM).
- Commercial, Industrial, and Institutional Water Use Best Management Practices Performance Measure (CII-BMPs Performance Measure).

- Conversion Threshold Performance Measure (Conversion Threshold PM).
- In-Lieu Technologies Performance Measure (In-Lieu Technologies PM).

DWR's recommended CII water use performance measures are subject to additional review, approval, and potential modifications by the State Water Board during its adoption process. Regardless of the outcome, the following foundational conditions remain valid:

- The implementation of DWR's recommended CII water use performance measures do not restrict urban retail water suppliers from implementing additional actions exceeding the requirements.
- The implementation of DWR's recommended CII water use performance measure do not require urban retail water users to report in their Annual Water Use Report the quantity of neither the CII water use nor the CII water use efficiency and amount of water saving as a whole or by classification (i.e., section).
- DWR's recommended CII water use performance measures do not set or rescind existing requirements for CII water use efficiency improvement actions or authorities for approving such actions.

CII Classification System PM

Based on the evaluation of technical and financial feasibility and public feedback on three options, DWR recommends a CII Classification System PM that is water-centric, with complete coverage of all CII water uses. The recommended classification system consists of the following 19 categories:

1. Water Recreation (e.g., public pools/water parks).
2. Recreation, non-water (e.g., athletic facilities, entertainment facilities, parks/cemeteries, golf course).
3. Food/Beverage (e.g., full service, fast food).
4. Laundry (e.g., laundromats, commercial/industrial laundries).
5. Lodging (e.g., hospitality, retirement homes).
6. Healthcare (e.g., hospitals, medical offices, medical and laboratory equipment and processes).
7. Offices.

8. Public Services (e.g., government, prisons and correctional facilities).
9. Sales (e.g., retail, shopping centers/malls, grocery stores and food markets).
10. Services (e.g., auto, personal).
11. Religious Buildings.
12. Education.
13. Vehicle Wash.
14. Industrial, non-manufacturing (e.g., temperature-controlled warehouses, non-temperature-controlled warehouses).
15. Manufacturing (e.g., aerospace and metal finishing industries; plating, printed circuit boards, and metal finishing; food processing and beverage manufacturing; high-tech industry (server facility/data center); petroleum refining and chemical industries; pharmaceutical and biotech industries; power plants).
16. Utility.
17. Mixed Use Commercial (e.g., strip malls, shopping centers, and other commercial spaces that are subject to frequent changes of tenants with different water use profiles to meet their corresponding business needs).
18. Dedicated Irrigation Meter.
19. Others (for those cannot be adequately categorized into the above categories).

These categories are sufficient to address major CII water uses and provide adequate differentiation among different CII sectors to facilitate data collections and future references. However, the system will not be overly detailed to create undue burdens on urban retail water suppliers for implementation.

DWR recommends a schedule for implementing the CII Classification System PM requiring urban retail water suppliers to complete their classifications within five years after the State Water Board's adoption.

- The minimum level of progress in account mapping per year is 20 percent of CII water accounts.
- If an urban retail water supplier does not meet the annual 20 percent mapping requirement, the urban retail water supplier is to include in its annual reporting an explanation and its plan to meet the full mapping requirement by Year 5.

- Should an urban retail water supplier experience a substantial hardship meeting the minimum level of progress, by Year 3, the urban retail water supplier will provide an alternative implementation plan to meet the full mapping requirement for the State Water Board's approval.

Implementation of the CII Classification System PM will not require urban retail water suppliers to reengineer their billing systems or any established account management practices, but will require information mapping for reporting purposes. In addition, the recommended performance measure requires DWR to provide technical assistance and develop guidance for mapping CII water uses into the adopted CII Classification System PM.

Urban retail water suppliers should establish formal procedures to collect classification information and update account mapping classifications upon receipt of modified or new service requests to keep the classification mapping up to date. Urban retail water suppliers should also coordinate with the corresponding local land use authority(ies) to add a requirement for consulting urban retail water suppliers, where appropriate, to inform changes and potential reclassifications.

After the State Water Board's adoption, DWR will develop a mapping guidance to assist urban retail water suppliers in implementation based on the North American Industry Classification System with necessary customization, including land use designations (i.e., assessor's parcel numbers) used by county assessor's offices for categorizing their water accounts for CII water use performance measure reporting purposes. Subject to further discussion and approval where necessary, DWR may coordinate with the State Water Board and other agencies to issue an advisory to local land use authorities (cities and counties) for cooperation and assistance to urban retail water suppliers in information-sharing during building permit issuances that may affect CII water use.

Refer to *Recommendations for Commercial, Industrial, and Institutional Water Use Classification System Performance Measure* (WUES-DWR-2021-17) for details on the recommended specifications, performance measure, implementation schedule, and reporting requirements for the CII Classification System PM.

CII-BMPs Performance Measure

During the stakeholder engagement process, urban retail water suppliers provided substantial feedback relative to their lack of authority to require CII water users to implement certain BMPs. Therefore, to establish a common understanding of existing CII-BMP implementation, DWR engaged stakeholders and professionals to develop a technical report titled *Best Management Practices for Improving Efficiency in Commercial, Industrial, and Institutional Water Use: Key Successes and Challenges in California* (WUES-DWR-2021-16.T1). This effort clarified the need to differentiate between "CII Water User BMPs" and "CII Water Supplier BMPs." CII Water User BMPs

are those urban retail water suppliers cannot unilaterally implement without explicit consent and collaboration of CII water users, property owners, or property managers. Conversely, CII Water Supplier BMPs are those urban retail water suppliers can implement unilaterally. CII Water User BMPs do not need to be excluded from CII Water Supplier BMPs, but can be incorporated in a different context, such as technical assistance to CII water users as a resource when requested and as a potential incentive.

Moreoever, CII Water User BMPs are not performance measures and are not part of the CII-BMPs Performance Measure, except where they may be included in actions considered in the CII-BMPs Performance Measure (such as incentive programs that offer CII Water User BMPs) or used to report on program success or challenges (such as the number of turf rebates provided to CII water users).

CII Water User BMPs considered in the CII-BMPs Performance Measure do not include process water BMPs, because process water is categorically excluded from the CII water use performance measures (WC Section 10608.12(n)). However, urban retail water suppliers are encouraged to collaborate with CII water users to implement process water BMPs, where feasible.

There is no single approach to implement CII-BMPs that would meet the needs of all urban retail water suppliers. This is because of the wide variability in CII water users and urban retail water suppliers' characteristics; what works for some CII water user types and urban retail water suppliers will not necessarily work for others. Therefore, selection of specific CII water user BMPs that will be supported by urban retail water supplier programs are necessarily subject to confirmation that those BMPs will be most effective for the service area CII water users.

DWR's recommended CII-BMPs Performance Measure would require urban retail water suppliers to design a CII-BMP implementation program specific to their respective service areas that considers local conditions and their experience from past efforts. The implementation program needs to include all of the five following categories of action contributing to improved water use efficiency:

- Outreach, technical assistance, and education.
- Incentives.
- Landscape irrigation and management practices.
- Operational practice updates.
- Collaboration and coordination.

DWR recommends that urban retail water suppliers implement their customized CII-BMP implementation program targeting water users that exceed a threshold for sectors (or classifications) and an individual threshold with the following elements:

- These thresholds of significance are: (1) the classifications (or sectors) of CII water users comprising the top 20 percent of CII water users in volume, and (2) the individual top 2.5 percent of CII water users, excluding process water use.
- The minimum CII-BMP implementation program elements includes at least one CII-BMP from each of the five recommended categories targeted to sectors and/or individual customers above the individual customer threshold.
- The BMPs implemented as part of the program are required to be supported with documentation demonstrating increased water use efficiency. Use of the BMP does not require approval by the State Water Board or DWR, as long as the BMP is demonstrated to increase water use efficiency.

DWR also recommends an alternative pathway for those urban retail water suppliers that have long-term CII-BMP implementation programs for which additional water use efficiencies for CII water users above the threshold may not be achievable.

In addition, DWR recommends the schedule for implementing the CII-BMPs Performance Measure requiring urban retail water suppliers to complete their program development within three years after the State Water Board adopts the performance measure. Refer to *Recommendations for Commercial, Industrial, and Institutional Water Use Best Management Practices Performance Measure* (WUES-DWR-2021-16) for details on recommended specifications, performance measure, implementation schedule, and reporting requirements for the CII-BMPs Performance Measure.

Conversion Threshold PM

Based on the analysis conducted by DWR and stakeholder feedback, DWR recommends a conversion threshold of 1 acre of landscape area irrigated by a mixed-use meter on a per parcel basis for converting to a DIM or in-lieu technologies, except for the following:

- Exempt landscapes as defined in MWELO and included in the recommended CII-DIMWUS:
  - Registered federal, State, and local historical sites.
  - Ecological projects that do not require a permanent irrigation system.
  - Mined-land reclamation projects that do not require a permanent irrigation system (pre-2015).

  - Existing plant collections, and botanical gardens, and arboretums open to the public (pre-2015).

  - Water use for cemeteries built before 2015.

    These landscape areas are exempted from the meter conversion requirements; however, they remain subject to the CII-BMPs Performance Measure.

- A mixed-use CII meter with non-irrigation water use of no more than 5 percent of the total water use can be considered a DIM for CII landscape irrigation for the purposes of calculating the UWUO.

Urban retail water suppliers must implement one of the following actions for qualified CII outdoor landscape areas and report accordingly in their Annual Water Use Report:

- Convert a mixed-use CII meter that exceeds the conversion threshold to a DIM (or equivalent technology) and report associated landscape area and water use under CII-DIMWUS, following DWR's guidelines and methodologies for calculating the UWUO. For reporting purposes, the resulting DIMs should be classified as a "CII Dedicated Irrigation Meter."

- Implement the In-Lieu Technologies recommended under the In-Lieu Technologies PM that are designed to achieve improved water use efficiency and adhere to the requirements per the In-Lieu Technologies PM.

DWR also recommends the schedule for implementing the Conversion Threshold PM requiring urban retail water suppliers to complete their landscape area measurements and determination of whether a DIM (or equivalent technology) or in-lieu technology will be implemented within five years after the State Water Board adopts the regulation. For efficiency, DWR recommends that each year, urban retail water suppliers conduct landscape measurements for outdoor landscape areas of the same CII water users for the purpose of the CII classification system to determine the needs for meter conversion.

DWR's recommendations for the Conversion Threshold PM do not restrict CII water users from modifying landscape areas, including reducing the total landscape area on a parcel basis, if desired. Similarly, the recommendation does not restrict CII water users, in coordination with urban retail water suppliers, from implementing the In-Lieu Technologies PM for any irrigated landscape including those irrigated with a DIM (or equivalent technology).

Refer to *Recommendations for Dedicated Irrigation Meter Conversion Threshold for Commercial, Industrial, and Institutional Outdoor Irrigation Water Use Performance Measure* (WUES-DWR-2021-18) for details on recommended specifications,

performance measure, implementation schedule, and reporting requirements for the Conversion Threshold PM.

In-Lieu Technologies PM

Related to the Conversion Threshold PM, the In-Lieu Technologies PM recommends implementing technologies to be used in-lieu of requiring DIMs for those irrigated landscape areas served by mixed-use meters that exceed the conversion threshold. Recognizing that the legislation states that performance measures are actions taken by urban retail water suppliers to improve CII water use efficiency, based on studies, investigations, and stakeholder input, DWR recommends the following in-lieu technologies that have demonstrated or expected improvements in CII water use efficiency:

- Water budget-based rate structures.
- Water budget-based management without a rate structure.
- Hardware Improvements with enhanced performance.
- Remote sensing combined with other data and hardware improvements.
- Landscape plant palette transformation programs.
- Others (as approved by the State Water Board).

Additionally, DWR recommends that urban retail water suppliers include necessary water management programs to implement communication, irrigation system maintenance, and irrigation scheduling BMPs that are consistent with the CII-BMPs Performance Measure to support demonstration of long-lasting water use efficiency.

DWR also recommends the schedule for implementing the In-Lieu Technologies PM requiring urban retail water suppliers to complete their landscape in-lieu technologies within five years after the first year of landscape measurement under the Conversion Threshold PM, with a total of up to six years for completing the implementation.

- Urban retail water suppliers need to prepare an In-Lieu Technologies Implementation Plan in Year 1 to outline the selection of in-lieu technologies and schedule for implementation, procedural and maintenance requirements, and a budget and financing plan.
- Starting Year 2, urban retail water suppliers have up to one year after the confirmed CII landscape areas for implementing the In-Lieu Technologies that are identified in the previous year under the Conversion Threshold PM.

Refer to *Recommendations for In-Lieu Technologies for Dedicated Irrigation Meters for Commercial, Industrial, and Institutional Outdoor Irrigation Water Use Performance Measure* (WUES-DWR-2021-19) for details on recommended specifications, performance measure, implementation schedule, and reporting requirements for the In-Lieu Technologies PM.

Implementation Schedule for Performance Measures and Reporting Periods for the Annual Water Use Report

Each recommended CII water use performance measure has its own implementation schedule. The multi-year implementation schedule for the recommended performance measures is divided into "Implementation Year," which starts from the date after the State Water Board adopts the regulations. The overall implementation allows a total of six years for transition; starting in Implementation Year 7, the implementation plan will be stabilized, and urban retail water suppliers could focus on updates and maintenance efforts to remain compliant. This approach provided enough time for urban retail water users to implement CII water use performance measures while achieving full compliance by 2030 or earlier. Table 4-2 shows DWR's recommended schedule for streamlined implementation of CII water use performance measures with their corresponding primary key performance indicators.

DWR recommends that urban retail water suppliers provide updates and progress reporting for implementing CII water use performance measures in their Annual Water Use Report, which also contains the reporting of the calculated UWUO, and actual water use consistent with the scope of the UWUO of the previous year. Consistent with the 2018 Legislation, DWR's recommendation allows urban retail water suppliers to submit their Annual Water Use Report on a calendar or fiscal year basis to better align with their business operation needs. Additional details on the requirements for Annual Water Use Reports will be discussed in the next section.

The annual schedule and associated reporting periods for urban retail water suppliers to submit their Annual Water Use Report to DWR may not be aligned with Implementation Years that refer to the State Water Board's adoption date for CII water use performance measures. Evaluating milestones (e.g., the end of Implementation Year 2) specified in the primary key performance indicators for anticipated progress are likely to occur within a reporting period, rather than aligning with the beginning or end of a reporting period. In other words, an Annual Water Use Report could have information on implementation of CII water use performance measures spanning in two consecutive Implementation Years. Urban retail water suppliers should report their implementation and milestone progress by Implementation Year accordingly to their corresponding annual reporting period.

Refer to *Summary of Recommendations for Performance Measures for Commercial, Industrial, and Institutional Water Use* (WUES-DWR-2022-15) for additional information relative to reporting requirements for CII water use performance measures.

This page left blank intentionally.

Table 4-2 California Department of Water Resources' Recommendations on Minimum Progress by Implementation Year for Streamlining Implementation of Commercial, Industrial, and Institutional Water Use Performance Measures

Implementation Year Starting after State Water Resources Control Board Adoption Date	**CII Classification System PM** **Primary KPI**: CII water users mapped for classification	**CII-BMPs Performance Measure** **Primary KPI**: CII-BMP metrics identified in the CII-BMP Program designed for implementing CII-BMPs based on the recommended thresholds[1] for focusing on major CII water use	**Conversion Threshold PM** **Primary KPI**: CII water user parcels reviewed for irrigated landscape area meeting the meter conversion threshold and selecting a compliance option[2]	**In-Lieu Technologies PM** **Primary KPI**: CII landscape areas confirmed for implementing In-Lieu Technologies under the Conversion Threshold PM
1	20% of all CII water users	Start implementing education and outreach BMPs (part of the CII-BMP Program) to all CII water users on new performance measure requirements	20% of all CII water user parcels[4, 6]	Complete In-Lieu Technologies implementation plan
2	40% of all CII water users	Complete CII-BMP Program development with metrics for targeted CII water users and actions based on 20% of all CII water users, classified[5] in Implementation Year 1	40% of all CII water user parcels[4, 6]	All CII landscape areas identified in the Conversion Threshold PM from Implementation Year 1
3	60% of all CII water users[3]	Start implementing CII-BMP Program against identified metrics If the thresholds[1] for targeted CII water users are not met in Year 2, complete CII-BMP Program development with metrics for targeted water users and actions based on 40% of all CII water users, classified[5] through Implementation Year 2	60% of all CII water user parcels[4, 6]	All CII landscape areas identified in the Conversion Threshold PM from Implementation Year 2
4	80% of all CII water users	CII-BMP Program implementation against identified metrics	80% of all CII water user parcels[4, 6]	All CII landscape areas identified in the Conversion Threshold PM from Implementation Year 3
5	100% of all CII water users	CII-BMP Program implementation against identified metrics and program update	100% of all CII water user parcels[4, 6]	All CII landscape areas identified in the Conversion Threshold PM from Implementation Year 4
6	100% of all CII water users with maintenance	CII-BMP Program implementation against identified metrics	100% of all CII water user parcels with maintenance	All CII landscape areas identified in the Conversion Threshold PM from Implementation Year 5
7 and afterwards	100% of all CII water users with maintenance	CII-BMP Program implementation against identified metrics	100% of all CII water user parcels with maintenance	All CII landscape areas identified in the Conversion Threshold PM with maintenance

Table 4-2 California Department of Water Resources' Recommendations on Minimum Progress by Implementation Year for Streamlining Implementation of Commercial, Industrial, and Institutional Water Use Performance Measures (contd.)

Implementation Year Starting after State Water Resources Control Board Adoption Date	CII Classification System PM **Primary KPI**: CII water users mapped for classification	CII-BMPs Performance Measure **Primary KPI**: CII-BMP metrics identified in the CII-BMP Program designed for implementing CII-BMPs based on the recommended thresholds[1] for focusing on major CII water use	Conversion Threshold PM **Primary KPI**: CII water user parcels reviewed for irrigated landscape area meeting the meter conversion threshold and selecting a compliance option[2]	In-Lieu Technologies PM **Primary KPI**: CII landscape areas confirmed for implementing In-Lieu Technologies under the Conversion Threshold PM

Notes:
[1] The thresholds are both of the following: (1) excluding process water, CII water users whose individual total water use volume is in the top 2.5 percent of all CII water users in the service area; and (2) excluding process water, all CII water users within the CII water use classifications, per the CII Classification System PM, which covers the top 20% of CII water users in water use.
[2] Compliance options are either implementing a dedicated irrigation meter (or equivalent technology) or implementing in-lieu technologies.
The confirmed implementation of a dedicated irrigation meter conversion (or equivalent technology) is subject to requirements under the Commercial, Industrial, and Institutional Outdoor Irrigation of Landscape Areas with Dedicated Irrigation Meters Water Use Efficiency Standard.
[3] Urban retail water suppliers that experience significant hardship in complying with the primary KPI of the CII Classification System PM for Implementation Year 3 shall provide an alternative schedule and plan to complete mapping of all CII water users and address the subsequent schedule impacts on other CII water use performance measures for the State Water Resource Control Board's approval.
[4] Urban retail water suppliers that experience significant hardship in complying with the primary KPI of the Conversion Threshold PM can, in any year, provide an alternative schedule and plan to complete necessary landscape measurements for meter conversion considerations and address the subsequent schedule impacts on the In-Lieu Technologies PM.
[5] Classified under the CII Classification System PM
[6] Same CII water users classified under the CII Classification System PM
Key:
CII = commercial, industrial, and institutional
CII Classification System PM = Commercial, Industrial, and Institutional Water Use Classification System Performance Measure
CII-BMPs Performance Measure = Commercial, Industrial, and Institutional Best Management Practices Performance Measure
Conversion Threshold PM = Conversion Threshold Performance Measure
In-Lieu Technologies PM = In-Lieu Technologies Performance Measure
KPI = key performance indicator

4.2 Annual Water Use Report

DWR recommends that urban retail water suppliers submit their Annual Water Use Report with the content and schedule consistent with the 2018 Legislation (WC Section 10609.24(a)) and its subsequent amendment through AB 1414. After the State Water Board's adoption of regulations, DWR will provide technical assistance by developing additional guidance and a template for preparing the Annual Water Use Report.

Required Content

DWR recommends that urban retail water suppliers prepare an Annual Water Use Report that includes all of the following with supporting information:

1. Calculation of UWUO.
2. Calculation of the actual urban water use.
3. Documentation of the implementation of performance measures.
4. A description of the progress made towards meeting the UWUO.
5. The validated water loss audit report.

DWR further recommends the inclusion of the following major specifications for urban retail water suppliers' Annual Water Use Report.

- The UWUO of urban retail water suppliers equals the sum of the aggregate estimated efficient indoor residential water use, aggregate estimated efficient outdoor residential water use, aggregate estimated efficient outdoor water use by CII-DIMs (or equivalent technologies), aggregate estimated efficient water loss, and aggregate estimated water use in accordance with all applicable variances.
  - The efficient indoor residential water use shall be estimated following the guidelines and methodologies provided in Section 5.1 of *Recommendations on Guidelines and Methodologies for Calculating Urban Water Use Objective* (WUES-DWR-2021-01B).
  - The efficient outdoor residential water use shall be estimated following the recommendations provided in ORWUS (see *Recommendations on Outdoor Residential Water Use Efficiency Standards* [WUES-DWR-2021-02]) and guidelines and methodologies provided in Section 5.2 of *Recommendations on Guidelines and Methodologies for Calculating Urban Water Use Objective* (WUES-DWR-2021-01B).

- The efficient outdoor water use by CII-DIMs (or equivalent technologies) shall be calculated following the recommendations provided in CII-DIMWUS (see *Recommendations for Commercial, Industrial, and Institutional Outdoor Irrigation of Landscape Areas with Dedicated Irrigation Meters Water Use Efficiency Standard* [WUES-DWR-2021-03]) and guidelines and methodologies provided in Section 5.3 of *Recommendations on Guidelines and Methodologies for Calculating Urban Water Use Objective* (WUES-DWR-2021-01B).

- The efficient distribution system water loss shall be determined based on the State Water Board's Draft Water Loss Performance Standard (State Water Board, 2022) and following the guidelines and methodologies provided in Section 5.4 of *Recommendations on Guidelines and Methodologies for Calculating Urban Water Use Objective* (WUES-DWR-2021-01B), or methodologies otherwise adopted by the State Water Board.

- The efficient water use for the variance for significant use of evaporative coolers shall be estimated following the recommendations, specifications, and guidelines and methodologies provided in *Recommendations for Variance for Significant Water Use of Evaporative Coolers, Methods of Calculation, and Supporting Data Requirements* (WUES-DWR-2021-05) and guidelines and methodologies provided in Section 6.2 and Section 6.3 of *Recommendations on Guidelines and Methodologies for Calculating Urban Water Use Objective* (WUES-DWR-2021-01B).

- The efficient water use for the variance for significant populations of horses and other livestock shall be estimated following the recommendations, specifications, and guidelines and methodologies provided in *Recommendations for Variance for Significant Populations of Horses and Other Livestock, Methods of Calculation, and Supporting Data Requirements* (WUES-DWR-2021-07) and guidelines and methodologies provided in Section 6.2 and Section 6.4 of *Recommendations on Guidelines and Methodologies for Calculating Urban Water Use Objective* (WUES-DWR-2021-01B).

- The efficient water use for the variance for significant fluctuations in seasonal populations shall be estimated following the recommendations, specifications, and guidelines and methodologies provided in *Recommendations for Variance for Significant Fluctuations in Seasonal Populations, Methods of Calculation, and Supporting Data Requirements* (WUES-DWR-2021-08) and guidelines and methodologies provided in Section 6.2 and Section 6.5 of *Recommendations on Guidelines and Methodologies for Calculating Urban Water Use Objective* (WUES-DWR-2021-01B).

- The efficient water use for the variance for significant landscaped areas irrigated with recycled water having high levels of total dissolved solids shall be estimated following the recommendations, specifications, and guidelines and methodologies provided in *Recommendations for Variance for Significant Landscaped Areas Irrigated with Recycled Water Having High Levels of Total Dissolved Solids, Methods of Calculation, and Supporting Data Requirements* (WUES-DWR-2021-09) and guidelines and methodologies provided in Section 6.2 and Section 6.6 of *Recommendations on Guidelines and Methodologies for Calculating Urban Water Use Objective* (WUES-DWR-2021-01B).

- The efficient water use for the variance for significant use of water for dust control for horse corrals and animal exercising arenas shall be estimated following the recommendations, specifications, and guidelines and methodologies provided in *Recommendations for Variance for Significant Use of Water for Dust Control for Horse Corrals and Animal Exercising Arenas, Methods of Calculation, and Supporting Data Requirements* (WUES-DWR-2021-10) and guidelines and methodologies provided in Section 6.2 and Section 6.7 of *Recommendations on Guidelines and Methodologies for Calculating Urban Water Use Objective* (WUES-DWR-2021-01B).

- The efficient water use for the variance for significant use of water to supplement ponds and lakes to sustain wildlife shall be estimated following the recommendations, specifications, and guidelines and methodologies provided in *Recommendations for Variance for Significant Use of Water to Supplement Ponds and Lakes to Sustain Wildlife, Methods of Calculation, and Supporting Data Requirements* (WUES-DWR-2021-11) and guidelines and methodologies provided in Section 6.2 and Section 6.8 of *Recommendations on Guidelines and Methodologies for Calculating Urban Water Use Objective* (WUES-DWR-2021-01B).

- The efficient water use for the variance for significant use of water during major emergencies shall be estimated following the recommendations, specifications, and guidelines and methodologies provided in *Recommendations for Variance for Significant Use of Water during Major Emergencies, Methods of Calculation, and Supporting Data Requirements* (WUES-DWR-2021-12) and guidelines and methodologies provided in Section 6.2 and Section 6.9 of *Recommendations on Guidelines and Methodologies for Calculating Urban Water Use Objective* (WUES-DWR-2021-01B).

- The efficient water use for the variance for significant use of water for commercial or noncommercial agricultural use shall be estimated following the recommendations, specifications, and guidelines and methodologies

provided in *Recommendations for Variance for Significant Use of Water for Commercial or Noncommercial Agricultural Use, Methods of Calculation, and Supporting Data Requirements* (WUES-DWR-2021-13) and guidelines and methodologies provided in Section 6.2 and Section 6.10 of *Recommendations on Guidelines and Methodologies for Calculating Urban Water Use Objective* (WUES-DWR-2021-01B).

- An urban retail water supplier that delivers water from a groundwater basin, reservoir, or other source that is augmented by potable reuse water may adjust its UWUO by a bonus incentive. The potable reuse bonus incentive shall be calculated following the accounting methodology provided in *Recommendations for Bonus Incentive, Methods of Calculation, and Supporting Data Requirements* (WUES-DWR-2021-14), and guidelines and methodologies provided in Section 7 of *Recommendations on Guidelines and Methodologies for Calculating Urban Water Use Objective* (WUES-DWR-2021-01B).

- If an urban retail water supplier chooses to use alternative data, they must receive approval from DWR and demonstrate that their data meets or exceeds the quality and accuracy of data and methodologies provided by DWR. Refer to each individual report and *Recommendations on Guidelines and Methodologies for Calculating Urban Water Use Objective* (WUES-DWR-2021-01B) for guidelines and methodologies for using alternative data in the calculations.

- Actual water use of urban retail water supplier equals the sum of aggregate residential water use, aggregate outdoor irrigation of landscape areas with DIMs (or equivalent technologies) in connection with CII water use, and aggregate water loss.

  - An urban retail water supplier's aggregate residential water use includes all potable and non-potable water for indoor and outdoor uses delivered to property classified as residential in county assessor rolls, regardless of whether the service connections providing this water and meters measuring this water have been classified by the urban retail water supplier as residential. The calculation of aggregate residential water use should follow the guidelines and methodologies provided in Section 8.1 of *Recommendations on Guidelines and Methodologies for Calculating Urban Water Use Objective* (WUES-DWR-2021-01B).

  - The calculation of an urban retail water supplier's aggregate outdoor irrigation with DIMs or equivalent technologies should follow the guidelines and methodologies provided in Section 8.2 of *Recommendations on Guidelines and Methodologies for Calculating Urban Water Use Objective* (WUES-DWR-2021-01B).

- An urban retail water supplier's prior year aggregate water loss is the volume of real losses from its water loss audit report for that year. The calculation of aggregate water loss should follow the guidelines and methodologies provided in Section 8.3 of *Recommendations on Guidelines and Methodologies for Calculating Urban Water Use Objective* (WUES-DWR-2021-01B).

DWR recommends review and revision of the guidelines and methodologies for calculating the UWUO, in coordination with the State Water Board, as needed. DWR further recommends that the State Water Board establish necessary procedures for such updates in the rulemaking process because of the adoption requirements for the revised guidelines and methodologies.

Reporting Schedule

The 2018 Legislation allows urban retail water suppliers to submit their Annual Water Use Report using the previous calendar or fiscal year data in the analysis. AB 1414 amended the due date for the first Annual Water Use Report from November 1, 2023, to January 1, 2024, to streamline the annual reporting schedules for urban water use efficiency and for water loss audits by urban retail water suppliers. Based on AB 1414, DWR recommends that the reporting period for the first Annual Water Use Report due on January 1, 2024 (2024 Report) be January 1, 2022, through December 31, 2022, for urban retail water suppliers conducting their analysis on a calendar basis, and July 1, 2022, through June 30, 2023, for those conducting their analysis on a fiscal year basis.

Consistent with the 2018 Legislation, DWR recommends allowing urban retail water suppliers to submit their Annual Water Use Report to DWR on a calendar or fiscal year basis to better align with their business operation needs. DWR will post these reports and pertinent information on its website accessible to the public.

DWR further recommends that the State Water Board consider in its rulemaking process needed flexibility for meeting the reporting requirements for the first Annual Water Use Report per the 2018 Legislation, which would be the 2024 Report for the following reasons.

- In addition to the required content, as part of the 2024 Report, urban retail water suppliers are required to provide a narrative that describes their water demand management measures to achieve their UWUO by January 1, 2027 (WC Section 10609.25).

- For CII water use performance measures, DWR also recommends that urban retail water suppliers provide a narrative that describes their assessments of past practices to inform the development of their CII Water Use Efficiency.

- As of date of writing this report, the State Water Board has not set a schedule for the rulemaking process for adopting the Recommendation Package in 2023. Therefore, there is uncertainty regarding the time period available between the adoption and the report due date on January 1, 2024, for developing necessary information to meet the content requirements.

- As mentioned previously, the reporting period of the 2024 Report (2023 calendar year data or 2022/2023 fiscal year data) is now confirmed to be before the date of the State Water Board's adoption, regardless of whether a calendar- or fiscal year-based reporting is used. While an UWUO can be assessed if sufficient time is available after the adoption, the actual water use is realized under the current regulatory framework for urban water use efficiency under SB X7-7. For up to two years after the regulation is adopted, the content of Annual Water Use Reports will be in transition.

DWR recommends the State Water Board consider reducing the content requirements for the 2024 Report for information only, allowing urban retail water suppliers opportunities to formulate plans for adapting to the new regulatory framework. An additional option could also include a deferred first Annual Water Use Report until the next due date on January 1, 2025, with all applicable requirements unchanged.

Report Streamlining

To implement data and reporting streamlining required by AB 1414, DWR recommends DWR's continued coordination with the State Water Board in implementing all the following:

- Identify urban water reporting requirements shared by both agencies, and post on each agency's website how the data is used for planning, regulatory, or other purposes.

- Analyze opportunities for more efficient publication of urban water reporting requirements within each agency and analyze how each agency can integrate various data sets in a publicly accessible location, identify priority actions, and implement priority actions identified in the analysis.

- Make appropriate data pertaining to the urban water reporting requirements that are collected by either agency available to the public according to the principles and requirements of the Open and Transparent Water Data Act (Part 4.9 (commencing with WC Section 12400)).

5.0 Glossary

The following key terms are listed below for easy reference. Where applicable, existing definitions from statutes and regulations are provided.

commercial agricultural use of water in residential parcels. Water used for products produced on residential parcels for commercial purposes.

commercial, industrial, and institutional water use. Water used by commercial water users, industrial water users, institutional water users, and large landscape water users, as defined in California Water Code Section 10608.12(d).

commercial water user. A water user that provides or distributes a product or service, as defined in California Water Code Section 10608.12(e).

dedicated irrigation meter. A meter used only for irrigation of outdoor landscape areas. However, a mixed-use meter with no more than five percent of total delivered water serving non-landscape irrigation purposes can also be considered a dedicated irrigation meter for the purpose of the urban water use objective and actual water use calculations and reporting.

equivalent technology. Any other device or process that is not a dedicated irrigation meter that measures the volume of water delivered to the landscape and reports directly to the urban retail water supplier, on the same time interval as service area dedicated irrigation meters and with the same accuracy as service area dedicated irrigation meters, such that it can be used for billing purposes if an urban retail water supplier chooses to do so.

evaporative cooler. A device that cools air through the evaporation of water.

evaporative cooling. The process by which thermal energy transfers from hot, dry air to liquid water, causing some of that water to vaporize and create cool, moist ai.

evapotranspiration. The amount of water transpired by plants, retained in plant tissues, and evaporated from plant tissues and surrounding soil surfaces.

evapotranspiration factor. An adjustment factor when applied to reference evapotranspiration that adjusts for plant factors and irrigation efficiency which are two major influences upon the amount of water that needs to be applied to the landscape.

high levels of total dissolved solids. For the purposes of variance development, high levels of total dissolved solids in recycled water were defined as between 900 and 1,600 milligrams per liter.

indirect potable reuse. The planned introduction of recycled water into a public water system, as defined in Section 116275 of the California Health and Safety Code, through the use of an environmental buffer such as that in the indirect potable reuse for groundwater recharge or reservoir water augmentation as decribed in California Water Code Sections 13561(c) and 13561(d).

indirect potable reuse for groundwater recharge. The planned use of recycled water for replenishment of a groundwater basin or an aquifer that has been designated as a source of water supply for a public water system, as defined in Section 116275 of the California Health and Safety Code, as defined in California Water Code Section 13561(c).

industrial water user. A water user that is primarily a manufacturer or processor of materials as defined by the North American Industry Classification System code sectors 31 to 33, inclusive, or an entity that is a water user primarily engaged in research and development, as defined in California Water Code Section 10608.12(i).

institutional water user. A water user dedicated to public service. This type of user includes, among other users, higher education institutions, schools, courts, churches, hospitals, government facilities, and nonprofit research institutions, as defined in California Water Code Section 10608.12(j).

irrigable-irrigated land. A landscape area of healthy vegetation where the vegetation appears to be in growth, not senesced, and is foliated. The area is presumed to be maintained and managed through active irrigation.

irrigable-not irrigated. A landscape area of planted and previously maintained vegetation that appears water stressed (brown or leafless plants). These are areas that likely were not irrigated when the imagery was taken, but possibly were irrigated in the past, and may be irrigated again during the year after the imagery was taken.

irrigation efficiency. The efficiency of water application and use, calculated by dividing a portion of applied water that is beneficially used by the total applied water, expressed as a percentage. The two main beneficial uses are crop water use (evapotranspiration) and leaching to maintain a salt balance.

key performance indicator. A performance metric for a specific business activity which is a quantifiable measure of performance over time for a specific objective.

large landscape. A nonresidential landscape as described in the performance measures for commercial, industrial, and institutional water use adopted pursuant to California Water Code Section 10609.10, as defined in California Water Code Section 10808.12(l).

livestock. The U.S. Code of Federal Regulations Section 780.328 defines "livestock" as, "cattle, sheep, horses, goats, and other domestic animals ordinarily raised or used on the farm. Turkeys or domesticated fowl are considered poultry and not livestock." California Civil Code Section 3080 states "livestock means any cattle, sheep, swine, goat, or horse, mule or other equines." For the purposes of variance development, only livestock greater than 200 pounds were considered because they consume more water on a daily basis than smaller livestock and could therefore have a material effect on an urban retail water supplier's water use.

major emergency. See "qualified major emergency."

major water users. Users that use a significant percentage of an individual urban retail water supplier's total supply, or users that generally use a substantial amount of process water as part of their regular operations.

material effect. Having real importance or great consequences. In the context of California Department of Water Resources' recommendations regarding the urban water use objective and variances, a material effect is an effect on the urban water use objective that could influence the compliance status of an urban retail water supplier.

mixed-use meter. A meter serving both indoor water use and outdoor landscape irrigation.

noncommercial agricultural use of water in residential parcels. Water used to grow products on residential parcels with noncommercial intentions.

performance measures. Actions to be taken by urban retail water suppliers that will result in increased water use efficiency by commercial, industrial, and institutional water users. Performance measures may include, but are not limited to, educating commercial, industrial, and institutional water users on best management practices, conducting water use audits, and preparing water management plans. Performance measures do not apply to process water, as defined in California Water Code Section 10608.12(n).

potable reuse. Direct potable reuse, indirect potable reuse for groundwater recharge, and reservoir water augmentation, as defined in California Water Code Section 13561, as defined in California Water Code 10608.12(o).

qualified major emergency. Based on the conditions or degrees of emergency, defined in California Government Code Section 8558(b), that have a direct connection to water use or water loss, or is declared by local water agencies as a "water shortage emergency" per California Water Code Section 350.

recycled water. Water which, as a result of treatment of waste, is suitable for a direct beneficial use or a controlled use that would not otherwise occur and is, therefore,

considered a valuable resource, as defined in California Water Code Section 13050(n), as defined in California Water Code Section 10608.12(q).

reference evapotranspiration. The evapotranspiration rate from an extended surface of 3- to 6-inch-tall (8- to 15-centimeter-tall) green grass cover of uniform height, actively growing, completely shading the ground, and not short on water (the reference evapotranspiration rate reported by the California Irrigation Management Information System).

reporting period. The years for which an urban retail water supplier reports compliance with the urban water use target, as defined in California Water Code Section 10608.12(s).

reservoir water augmentation. The planned placement of recycled water into a raw surface water reservoir used as a source of domestic drinking water supply for a public water system, as defined in California Health and Safety Code Section 116275, or into a constructed system conveying water to such a reservoir, as defined in California Water Code 13561(d).

seasonally occupied home. Homes occupied for part of the year, seasonally or for recreation, that include second homes, vacation homes, and vacation rentals, provided that the home is still categorized as a residence. It is not necessary for a seasonally occupied home to have any particular seasonal pattern of occupancy – only that it is not the usual residence for any individual. For the purposes of variance development, all residential homes with seasonal, recreational, or occasional occupants were counted as seasonally occupied.

Special Landscape Area. An area of the landscape dedicated solely to edible plants, 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, as defined in California Code of Regulations, Title 23, Section 491(iii).

state of emergency. State of emergency is as established in California Government Code Section 8558(b). “State of emergency” means the duly proclaimed existence of conditions of disaster or of extreme peril to the safety of persons and property within the state caused by conditions such as air pollution, fire, flood, storm, epidemic, riot, drought, cyberterrorism, sudden and severe energy shortage, plant or animal infestation or disease, the Governor’s warning of an earthquake or volcanic prediction, or an earthquake, or other conditions, other than conditions resulting from a labor controversy or conditions causing a “state of war emergency,” which, by reason of their magnitude, are or are likely to be beyond the control of the services, personnel, equipment, and facilities of any single county, city and county, or city and require the combined forces of a mutual aid region or regions to combat, or with respect to regulated energy utilities, a

sudden and severe energy shortage requires extraordinary measures beyond the authority vested in the California Public Utilities Commission. California Government Code Section 8558 also defines two other conditions or degrees of emergency (state of war emergency and local emergency).

threshold of significance. A minimum volume of unique water use in an urban retail water supplier's service area that could have a material effect on that urban retail water supplier's urban water use objective.

total dissolved solids. The inorganic salts, metals, and minerals present in water. This term is usually expressed in parts per million or milligrams per liter.

urban retail water supplier. A water supplier, either publicly or privately owned, that directly provides potable municipal water to more than 3,000 end users or that supplies more than 3,000 acre-feet of potable water annually at retail for municipal purposes, as defined in California Water Code Section 10608.12(t).

urban water use efficiency standards. The standards effective through California Water Code Section 10609.4 (indoor residential use) or adopted by the State Water Resources Control Board (outdoor residential, water loss, and commercial, industrial, and institutional outdoor irrigation of landscape areas with dedicated meters) pursuant to California Water Code Section 10609.2.

urban water use objective. An estimate of aggregate efficient water use for the previous year based on adopted water use efficiency standards and local service area characteristics for that year, as described in California Water Code Section 10609.20, as defined in California Water Code Section 10608.12(u).

variances. Allowable volumes of water that can be added to the urban water use objective for efficient unique uses of water that could have a material effect on the urban water use objective.

water loss. The total of apparent loss and real loss (California Code of Regulations, Title 23, Section 638.1(a) and Section 638.1(k), respectively) in an urban retail water supplier's system. Apparent loss means loss due to unauthorized consumption and/or nonphysical (paper) loss attributed to inaccuracies associated with customer metering or systematic handling errors. Real loss means the physical water loss from the pressurized potable water system and the urban retail water supplier's potable water storage tanks, up to the point of customer consumption.

This page left blank intentionally.

6.0 References

CNRA, CalEPA, and CDFA (California Natural Resources Agency, California Environmental Protection Agency, and California Department of Food and Agriculture). 2020. California Water Resilience Portfolio. July. https://waterresilience.ca.gov/wp-content/uploads/2020/07/Final_California-Water-Resilience-Portfolio-2020_ADA3_v2_ay11-opt.pdf

CNRA et al. (California Natural Resources Agency, California Department of Water Resources, State Water Resources Control Board, California Environmental Protection Agency, and California Department of Food and Agriculture). 2022. California's Water Supply Strategy: Adapting to a Hotter, Drier Future. August. Accessed at: https://resources.ca.gov/-/media/CNRA-Website/Files/Initiatives/Water-Resilience/CA-Water-Supply-Strategy.pdf

DWR (California Department of Water Resources). 2016. Methodologies for Calculating Baseline and Compliance Urban Per Capita Water Use.

_____. 2021. Results of the Indoor Residential Water Use Study, A Report to the Legislature Prepared Pursuant to Water Code Section 10609.4(b). November. Accessed at: https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Water-Use-And-Efficiency/AB-1668-and-SB-606-Conservation/Results-of-the-Indoor-Residential-Water-Use-Study.pdf

DWR and State Water Board (California Department of Water Resources and State Water Resources Control Board). 2018. Making Water Conservation a California Way of Life. Primer of 2018 Legislation on Water Conservation and Drought Planning Senate Bill 606 (Hertzberg) and Assembly Bill 1668 (Friedman). Accessed at: https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Water-Use-And-Efficiency/Make-Water-Conservation-A-California-Way-of-Life/Files/PDFs/Final-WCL-Primer.pdf?la=en&hash=B442FD7A34349FA91DA5CDEFC47134EA38ABF209

DWR et al. (California Department of Water Resources, State Water Resources Control Board, California Department of Food and Agriculture, California Public Utilities Commission, and California Energy Commission). 2017. Making Water Conservation a California Way of Life, Implementing Executive Order B-37-16. Accessed at: https://cawaterlibrary.net/wp-content/uploads/2017/06/20170407_EO_B-37-16_Final_Report.pdf

State Water Board (State Water Resources Control Board). 2022. Water Loss Performance Standards Draft Regulatory Text. August 8. Accessed at: https://www.waterboards.ca.gov/water_issues/programs/conservation_portal/docs/2022/water-loss-regulatory-text-draft-22-08-05.pdf

This page left blank intentionally.

Appendix A – Urban Water Use Efficiency Recommendation Package Reports Incorporated by Reference

DWR (California Department of Water Resources). September 2022. Assessment of Recommended Urban Water Use Efficiency Standards in Relation to the Senate Bill X7-7 Statewide Target. DWR Report Number: WUES-DWR-2021-01A.T1.

DWR (California Department of Water Resources). September 2022. Recommendations for Guidelines and Methodologies for Calculating Urban Water Use Objective. DWR Report Number: WUES-DWR-2021-01B.

DWR (California Department of Water Resources). September 2022. Recommendations for Outdoor Residential Water Use Efficiency Standard. DWR Report Number: WUES-DWR-2021-02.

DWR (California Department of Water Resources). September 2022. Landscape Area Measurements Final Project, Report EA-133C-16-CQ-0044. DWR Report Number: WUES-DWR-2021-02.T1.

DWR (California Department of Water Resources). September 2022. Recommendations for Commercial, Industrial, and Institutional Outdoor Irrigation of Landscape Areas with Dedicated Irrigation Meters Water Use Efficiency Standard. DWR Report Number: WUES-DWR-2021-03.

DWR (California Department of Water Resources). September 2022. Summary of Recommendations for Variances. DWR Report Number: WUES-DWR-2022-04.

DWR (California Department of Water Resources). September 2022. Recommendations for Variance for Significant Water Use of Evaporative Coolers, Methods of Calculation, and Supporting Data Requirements. DWR Report Number: WUES-DWR-2021-05.

DWR (California Department of Water Resources). September 2022. Methods for Estimating Residential Evaporative Cooler Water Consumption and Prevalence using Account-Level Water and Energy Consumption Data. DWR Report Number: WUES-DWR-2021-05.T1.

DWR (California Department of Water Resources). September 2022. Recommendations for Deferring Variance for Significant Water Use of Home Use Medical Devices. DWR Report Number: WUES-DWR-2021-06.

DWR (California Department of Water Resources). September 2022. Recommendations for Variance for Significant Populations of Horses and Other Livestock, Methods of Calculation, and Supporting Data Requirements. DWR Report Number: WUES-DWR-2021-07.

DWR (California Department of Water Resources). September 2022. Recommendations for Variance for Significant Fluctuations in Seasonal Populations, Methods of Calculation, and Supporting Data Requirements. DWR Report Number: WUES-DWR-2021-08.

DWR (California Department of Water Resources). September 2022. Methods for Estimating Seasonal Populations with Water and Energy Data. DWR Report Number: WUES-DWR-2021-08.T1.

DWR (California Department of Water Resources). September 2022. Recommendations for Variance for Significant Landscaped Areas Irrigated with Recycled Water Having High Levels of Total Dissolved Solids, Methods of Calculation, and Supporting Data Requirements. DWR Report Number: WUES-DWR-2021-09.

DWR (California Department of Water Resources). September 2022. Recommendations for Variance for Significant Use of Water for Dust Control for Horse Corrals and Animal Exercising Arenas, Methods of Calculation, and Supporting Data Requirements. DWR Report Number: WUES-DWR-2021-10.

DWR (California Department of Water Resources). September 2022. Recommendations for Variance for Significant Use of Water to Supplement Ponds and Lakes to Sustain Wildlife, Methods of Calculation, and Supporting Data Requirements. DWR Report Number: WUES-DWR-2021-11.

DWR (California Department of Water Resources). September 2022. Recommendations for Variance for Significant Use of Water During Major Emergencies, Methods of Calculation, and Supporting Data Requirements. DWR Report Number: WUES-DWR-2021-12.

DWR (California Department of Water Resources). September 2022. Recommendations for Variance for Significant Use of Water for Commercial or Noncommercial Agricultural Use, Methods of Calculation, and Supporting Data Requirements. DWR Report Number: WUES-DWR-2021-13.

DWR (California Department of Water Resources). September 2022. Recommendations for Bonus Incentive Methods of Calculation and Supporting Data Requirements. DWR Report Number: WUES-DWR-2022-14.

DWR (California Department of Water Resources). September 2022. Summary of Recommendations for Performance Measures for Commercial, Industrial, and Institutional Water Use. DWR Report Number: WUES-DWR-2022-15.

DWR (California Department of Water Resources). September 2022. Recommendations for Commercial, Industrial, and Institutional Water Use Best Management Practices Performance Measure. DWR Report Number: WUES-DWR-2022-16.

DWR (California Department of Water Resources). September 2022. Best Management Practices for Improving Efficiency in Commercial, Industrial, and Institutional Water Use: Key Successes and Challenges in California. DWR Report Number: WUES-DWR-2022-16.T1.

DWR (California Department of Water Resources). September 2022. Recommendations for Commercial, Industrial, and Institutional Water Use Classification System Performance Measure. DWR Report Number: WUES-DWR-2022-17.

DWR (California Department of Water Resources). September 2022. Recommendations for Dedicated Irrigation Meter Conversion Threshold for Commercial, Industrial, and Institutional Outdoor Irrigation Water Use Performance Measure. DWR Report Number: WUES-DWR-2022-18.

DWR (California Department of Water Resources). September 2022. Recommendations for In-Lieu Technologies for Dedicated Irrigation Meters for Commercial, Industrial, and Institutional Outdoor Irrigation Water Use Performance Measure. DWR Report Number: WUES-DWR-2022-19.

DWR (California Department of Water Resources). September 2022. Stakeholder Outreach Summary for Developing Urban Water Use Efficiency Standards, Variances, and Performance Measures. DWR Report Number: WUES-DWR-2021-20.

DWR (California Department of Water Resources). September 2022. Urban Water Use Efficiency Recommendation Package: Glossary and Abbreviations and Acronyms. DWR Report Number: WUES-DWR-2021-21.

This page left blank intentionally.