Recommendations for Commercial, Industrial, and Institutional Water Use Best Management Practices Performance Measure

WUES-DWR-2021-16

A Report to the State Water Resources Control Board Prepared Pursuant to California Water Code Section 10609.10

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.

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Abbreviations and Acronyms

2013 CII Task Force Report	2013 Commercial, Industrial, and Institutional Task Force Water Use Best Management Practices Report to the Legislature
2018 Legislation	2018 Legislation on Water Conservation and Drought Planning (Senate Bill 606 [Hertzberg] and Assembly Bill 1668 [Friedman], as amended)
AB	Assembly Bill
ACWA	Association of California Water Agencies
AMI	advanced metering infrastructure
APN	assessor's parcel number
AWWA	American Water Works Association
BMP	best management practice
CalWEP	California Water Efficiency Partnership
CCR	California Code of Regulations
CII	commercial, industrial, and institutional
CII-BMP	commercial, industrial, and institutional water use best management practice
CII-BMP implementation program	commercial, industrial, and institutional water use best management practice implementation program
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
CII Water User WMP	water management plan for commercial, industrial, and institutional water users
Conversion Threshold PM	Conversion Threshold Performance Measure
CPUC	California Public Utilities Commission
CUWA	California Urban Water Agencies
CUWCC	California Urban Water Conservation Council (now the California Water Efficiency Partnership)
CWA	California Water Association
DIM	dedicated irrigation meter
gpcd	gallons per capita per day
DWR	California Department of Water Resources
In-Lieu Technologies PM	In-Lieu Technologies Performance Measure
IRWUS	Indoor Residential Water Use Efficiency Standard
Legislature	California State Legislature
MWELO	Model Water Efficient Landscape Ordinance
NAICS	North American Industry Classification System
ORWUS	Outdoor Residential Water Use Efficiency Standard
Recommendation Package	Urban Water Use Efficiency Recommendation Package
ROI	return on investment
SB	Senate Bill
State	State of California
State Water Board	State Water Resources Control Board
UWUO	urban water use objective
WC	California Water Code
WLS	Water Loss Standard
WMP	water management plan

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Executive Summary

The California State Legislature passed the 2018 Legislation on Water Conservation and Drought Planning (Senate Bill 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. This report is submitted pursuant to California Water Code (WC) Section 10609.10, which 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 and recommend performance measures for commercial, industrial, and institutional (CII) water use for the State Water Board's adoption. Among other things, these performance measures include recommendations for a Commercial, Industrial, and Institutional Water Use Best Management Practices Performance Measure (CII-BMPs Performance Measure) for those CII water users that exceed a recommended size, volume of water use, or other thresholds (WC Section 10609.10).

DWR developed the recommendations for the CII-BMPs Performance Measure based on the legislative directive. In particular, the WC also requires the recommended CII water use performance measures to be consistent with *Commercial, Industrial, and Institutional Task Force Water Use Best Management Practices Report to the Legislature* (DWR, 2013a and 2013b). The technical and financial feasibility recommendations provided in that report are aimed at supporting the economic productivity of the State of California's (State) CII sectors (WC Section 10609.10(c)). The documentation of the implementation of the CII water use performance measures, including the CII-BMPs Performance Measure, is required in the urban retail water supplier's Annual Water Use Report filing (WC Section 10609.24(a)(3)). However, quantification of water use per category is not required as the associated CII water use is excluded in the quantification reporting per provisions related to the urban water use objective.

Consistent with the legislative directive, DWR used a public process involving a diverse group of stakeholders in the review and development of the CII-BMPs Performance Measure. The Water Use Studies Working Group and the Standards, Methods, and Performance Measures Working Group that DWR established to assist in implementing the 2018 Legislation were the primary stakeholders involved in the development process for the CII water use performance measures. Additional stakeholders included 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 CII-BMPs Performance Measure. Their input informed development and refinements for the applicable scope, specific thresholds for

implementation of CII water use best management practices for those CII water users that exceed the threshold, and performance measures for implementation by urban retail water suppliers. Technical feasibility, financial considerations, and associated potential economic effects on CII sectors were also considered during the development process.

In responding to stakeholder input, DWR incorporated the consideration of the limited authority urban retail water suppliers may have to unilaterally implement certain actions without explicit cooperation from CII water users in formulating performance measures. DWR, through extensive review of literature, survey information, and stakeholder engagement, explored implementation considerations and potential effects on urban retail water suppliers to inform the technical and financial feasibility of implementing various best management practices.

Based on the research, technical studies, and stakeholder feedback, DWR recommends a CII-BMPs Performance Measure that requires urban retail water suppliers to develop an implementation plan specific to their local conditions for the top 20 percent of CII water users ranked according to their CII water use volume. Process water may be included in the volume for identifying the focused group of CII water users, but it is not subject to the CII-BMPs Performance Measure (although encouraged). For efficiency in streamlining the implementation, DWR also recommends that the schedule for implementing the CII-BMPs Performance Measure be coordinated with implementing the Commercial, Industrial, and Institutional Water Use Classification System Performance Measure and that implementation be completed within six years after the State Water Board adopts the regulation.

DWR's recommendations for the CII-BMPs Performance Measure are included in the report, *Summary of Recommendations for Performance Measures for Commercial, Industrial, and Institutional Water Use* (WUES-DWR-2021-15), along with other recommendations on CII water use performance measures for coordinated implementation, which DWR prepared per the requirements of the 2018 Legislation and that are to be transmitted to the State Water Board for adoption. DWR's recommendations for the CII-BMPs Performance Measure and associated annual reporting requirements are also included in the report, *Recommendations for Urban Water Use Efficiency Standards, Variances, Performance Measures, and Annual Water Use Reporting* (WUES-DWR-2021-01A), which provides the complete context of the Urban Water Use Efficiency Recommendation Package and its implementation.

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. Details of these provisions are summarized in *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)* (DWR and State Water Board, 2018).

1.1 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 California Water Code (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. The 2018 Legislation requires a bottom-up estimate from urban retail water suppliers of the urban water use objective (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.

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 Resources Control Board (State Water Board), the California Department of Water Resources (DWR) submitted the joint recommendations for IRWUS to the California State Legislature (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 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 Section10609.14). 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 and 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 measured by commercial, industrial, and institutional dedicated irrigation meters (CII-DIM) (or equivalent technologies) for CII outdoor irrigation of landscape areas (already included as one of the standards) and process water (excluded from

both the UWUO and CII water use performance measures). More detailed discussion is provided in Section 1.2.

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.

1.2 Commercial, Industrial, and Institutional Water Use Performance Measures

Following the 2012 to 2016 drought, the State reevaluated its water use practices and resolved to prioritize long-term water conservation and drought planning. In a broader sense, the 2018 Legislation calls for increased water conservation and more efficient use of water. In particular, WC Section 10608(e) states, “The success of [S]tate and local water conservation programs to increase efficiency of water use is best determined on the basis of measurable outcomes.” Providing measurable outcomes of increased water use efficiency requires the evaluation of baseline water use conditions for comparative purposes. However, recognizing that the diverse conditions preclude determination of baseline water use for varying water use in CII sectors in the State, the 2018 Legislation requires DWR to make recommendations on CII water use

performance measures for CII water uses other than outdoor irrigation for landscapes with DIMs (or equivalent technologies).

In the context of CII water use, recommendations on sustainable water use and demand reduction performance measures must, "[s]upport the economic productivity of California's agricultural, commercial, and industrial sectors" (WC Section 10608.4(j)), but that, "…does not require a reduction in the total water used in the agricultural or urban sectors, because other factors, including, but not limited to, changes in agricultural economics or population growth may have greater effects on water use. This part does not limit the economic productivity of California's agricultural, commercial, or industrial sectors*"* (WC Section 10608.8(c)).

DWR was required to conduct necessary studies and investigations and make recommendations on performance measures for CII water use to the State Water Board for its adoption by no later than October 1, 2021, as specified in AB 1668 and codified in WC Section 10609.10. In this context, "CII water use" means water used by commercial water users, industrial water users, institutional water users, and large landscape water users (WC Section 10608.12(d)) with the following supporting definitions.

> *"Commercial water user" means a water user that provides or distributes a product or service* (WC 10608.12(e))*.*
>
> *"Industrial water user" means 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* (WC 10608.12(i)).
>
> *"Institutional water user" means 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* (WC 10608.12(j)).
>
> *"Large landscape" means a nonresidential landscape as described in the performance measures for CII water use adopted pursuant to WC Section 10609.10* (WC Section 10608.12(l)).

In addition, per WC Section 10608.12(n), "performance measures" are:

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

Furthermore, per WC Section 10608.12(p), "process water" means:

> *…water used by industrial water users for producing a product or product content or water used for research and development. Process water includes, but is not limited to, continuous manufacturing processes, and water used for testing, cleaning, and maintaining equipment. Water used to cool machinery or buildings used in the manufacturing process or necessary to maintain product quality or chemical characteristics for product manufacturing or control rooms, data centers, laboratories, clean rooms, and other industrial facility units that are integral to the manufacturing or research and development process is process water. Water used in the manufacturing process that is necessary for complying with local, [S]tate, and federal health and safety laws, and is not incidental water, is process water. Process water does not mean incidental water uses.*

As previously mentioned, except for landscape irrigation with DIMs (or equivalent technologies), CII water use is not part of the UWUO that urban retail water suppliers need to report on quantitively in their respective Annual Water Use Reports. Water use efficiency in CII sectors is instead addressed through implementation of CII water use performance measures. The 2018 Legislation directs DWR to develop and recommend CII water use performance measures that include the following:

- CII water use classification system to address significant uses of water.
- Minimum size threshold for converting mixed-use CII meters to DIMs or in-lieu technologies.
- BMPs, which may include, but are not limited to, water audits and water management plans for CII customers above a certain recommended size, volume of use, or other threshold.

The 2018 Legislation further requires that the recommended CII water use performance measures be consistent with *Commercial, Industrial, and Institutional Task Force Water Use Best Management Practices Report to the Legislature* (DWR, 2013a and 2013b) (WC Section 10609.10(c)), hereinafter referred to as the "2013 CII Task Force Report." The Task Force consisted of stakeholders and experts convened by DWR and the California Urban Water Conservation Council, which is now the California Water Efficiency Partnership (CUWCC, now CalWEP), to develop BMPs for CII water users, as directed by WC Section 10608. The following recommendations by the Task Force (DWR, 2013a) are particularly relevant to the development of CII water use performance measures:

Recommendation 5-7: *DWR should work with the Association of California Water Agencies (ACWA), CUWCC* [now CalWEP]*, California Urban Water Agencies (CUWA), California Public Utilities Commission (CPUC), California Water Association (CWA), and American Water Works Association (AWWA) to develop a full-spectrum, water-centric standardized classification system of customer categories. This classification system should include consistent use of North American Industry Classification System (NAICS) codes and assessors' parcel numbers (APNs).*

Recommendation 5-8: *DWR, in consultation with a stakeholder advisory committee and through a public process, should develop a system and implementation plan for water production, delivery, and use data collection for classification and for reporting and tracking at the user, water service provider, [S]tate, and federal levels. One or more of the following options should be considered:*

- ***Option 5-8.1****: DWR should develop a water-centric water use and user classification system.*
- ***Option 5-8.2****: Water service providers should classify water users using a common classification system and transition their customer databases to incorporate this system.*
- ***Option 5-8.3****: Water service providers should consider recording and maintaining key data fields, such as assessor's* [sic] *parcel numbers for customers. This would enable the linking of water usage data with information from other sources for purposes of metrics, water demand analysis, and demand projections.*
- ***Option 5-8.4****: Water service providers and self-supplied water users meeting defined criteria should be required to report water use to the [S]tate.*
- ***Option 5-8.5****: Water service providers, CUWCC* [now CalWEP]*, and water users should expand on landscape irrigation water use categorizations that recognize and promote BMPs for separate metering, especially for larger and mixed use sites.*

Recommendation 6-3: *Water and energy service providers should incorporate water audits into their efficiency programs, consider financial incentives for BMP implementation, and provide other technical assistance as appropriate.*

> ***Recommendation 6-4:*** *Organizations representing businesses and industry, water service providers, CUWCC* [now CalWEP]*, other interested parties, and DWR should educate CII water users or entities on the BMPs and approaches to doing audits and performing a cost-effectiveness analysis.*

The ”Recommendations” section (Section 5.2) of the 2013 CII Task Force Report states:

> *This section does not currently recommend any single metric for use in all CII sectors.*
>
> *Furthermore, the CII Task Force cautions against setting regulatory minimum standards for water use efficiency metrics that would be applicable to specific CII establishments, sectors, or subsectors. Even within subsectors, it would be difficult to set uniform standards across CII establishments (defined as individual CII water user sites) because of the variability in the types of products made or services provided and the many confounding factors in how water is used.*

The 2013 CII Task Force Report presents the following option for further study or action to improve data collection and reporting. This option is specifically related to the development of a water use and user classification system (DWR, 2013b):

> ***Option 1****: DWR should develop a water use and user classification system. The system should comprehensively address all sectors of water use, not just CII water users. The system should be designed for all water use establishments to be classified using a full-spectrum water-centric coding system integrated with national, [S]tate, regional, and local goals and objectives for water resources planning and management. The classification system should include common definitions for water use sectors for consistent aggregation of data. Consideration should be given to using a commonly accepted coding system, such as NAICS, as a basis for definitions.*

Section 7.3.5 of Volumes I and II of the 2013 CII Task Force Report provides recommendations for large landscape BMPs (DWR 2013a and 2013b).

Per WC Section 10609.10(d), the State Water Board, in coordination with DWR, must adopt the performance measures on or before June 30, 2022. Documentation of the implementation of CII water use performance measures, including progress and implementation of a performance measure for CII water use best management practices (CII-BMP), is required in the urban retail water supplier’s Annual Water Use Report filing (WC Section 10609.24(a)(3)).

1.3 Purpose of the Report

Per legislative requirements and with stakeholder engagement, DWR conducted studies and investigations to develop and recommend CII water use performance measures for adoption by the State Water Board. This report focuses on the Commercial, Industrial, and Institutional Water Use Best Management Practices Performance Measure (CII-BMPs Performance Measure) and associated thresholds for implementation and is one of three performance measure-specific reports produced by DWR per requirements of the 2018 Legislation.

Commercial, Industrial, and Institutional Water Use Best Management Practices

The 2018 Legislation directs DWR to recommend CII-BMPs for CII water users that exceed a certain recommended size, volume, or other threshold (WC Section 10609.10(b)(3)). Two specific CII-BMPs may include, but are not limited to, water audits and water management plans, and DWR is not required to include them in the recommendation. Rather, DWR conducted research and literature reviews to identify proper CII-BMPs to be included in the recommended performance measure.

Addressing water use efficiency through implementation of CII-BMPs is challenging, because of the wide variety of types of CII water users, their water use profiles, water-using equipment and practices, local site and operational characteristics, and specific business cultures. Unlike residential water uses, where water use patterns are relatively consistent and where purposes of water use are fairly uniform, CII water uses are highly variable in the pattern and purpose of use (Mitchell and Chesnutt, 2017). The 2013 CII Task Force Report notes that it is important to recognize that each CII site is unique and needs to be treated as such. Accordingly, the approaches to identifying an implementation threshold; implementing BMPs and metrics to demonstrate improved water use efficiency; and evaluating technical feasibility and cost-effectiveness should consider that uniqueness.

Per the 2018 Legislation, the performance measures for urban retail water suppliers recommended by DWR are the actions they take to improve CII water use efficiency (WC Section 10608.12(n)). In the Annual Water User Report, urban retail water suppliers are required to report the progress on their CII water use performance measures, including the CII-BMPs Performance Measure. Stakeholder input during the recommendation development process suggested it is important to distinguish between CII-BMPs to be implemented by CII water users and those that can be implemented by urban retail water suppliers. This distinction is critical relative to DWR's recommendations.

Relationship to California Department of Water Resources' 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 different topics 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 an Urban Water Use Efficiency Recommendation Package (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.

Specifically, this report, *Recommendations for Commercial, Industrial, and Institutional Water Use Best Management Practices Performance Measure* (WUES-DWR-2021-16), provides the detailed documentation for the review and subsequent development of specifications; the performance measure; and annual reporting requirements for CII-BMPs. The recommendations for the CII-BMPs Performance Measure are summarized in the report, *Summary of Recommendations for Performance Measures for Commercial, Industrial, and Institutional Water Use* (WUES-DWR-2021-15), along with other performance measures for coordinated implementation. The additional context, performance measure development process and approach, evaluation of options, and stakeholder input included in this document are incorporated by reference. The recommendations for CII-BMPs and associated annual reporting requirements are also included in the report, *Recommendations for Urban Water Use Efficiency Standards, Variances, Performance Measures, and Annual Water Use Reporting* (WUES-DWR-2021-01A), which provides the complete context of the Recommendation Package and its implementation. 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).

Effects on Existing Law and Regulations

DWR developed the recommendations on the CII-BMPs Performance Measure pursuant to legislative directive. The recommended CII-BMPs Performance Measure does not rescind or modify existing requirements for implementing CII-BMPs or authorities for approving such actions.

1.4 Report Organization

This report is organized into six sections:

- **Section 1** – **Introduction** provides the background and purpose of this document.
- **Section 2** – **Scope Definition** provides the process and rationales used in defining the scope for CII-BMP recommendation development.
- **Section 3** – **Approach** describes the technical approach and stakeholder engagement that DWR conducted to support performance measure development, and those specifically applied to the CII-BMPs Performance Measure.
- **Section 4** – **Recommendations for Commercial, Industrial, and Institutional Water Use Best Management Practices Performance Measure** provides DWR's recommendations for the specifications, guidelines, and methodologies for this performance measure.
- **Section 5** – **Glossary** provides a list of key terms and their definitions used in this document.
- **Section 6** – **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 Scope Definition

In accordance with WC Section 10609.10, DWR conducted studies and investigations, solicited stakeholder participation, and ensured consistency with the 2013 CII Task Force Report in developing the information necessary to make a recommendation on the CII-BMPs Performance Measure to the State Water Board:

> *(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:* […]
>
> > *(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.* […]
>
> *(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.*

DWR's studies and investigations included conducting a literature search, contracting preparation of a technical report on CII-BMPs (see *Best Management Practices for Improving Efficiency in Commercial, Industrial, and Institutional Water Use: Key Successes and Challenges in California* [WUES-DWR-2021-16.T.1]), conducting stakeholder engagement and surveys, and identifying a performance measure for implementation of CII-BMPs.

Consistent with the WC, extensive stakeholder outreach was conducted for developing the recommendations on the CII-BMPs Performance Measure, with incorporation of feedback and experience provided by urban retail water suppliers and stakeholders. Implementation challenges were also identified.

DWR's goals in conforming to WC Section 10609.10 were to:

- Assess applicable CII-BMPs for implementation.

- Identify the threshold and schedule for implementation of CII-BMPs.

2.1 Roles in Implementation of Commercial, Industrial, and Institutional Water Use Best Management Practices

This section discusses the respective roles of CII water users and urban retail water suppliers in implementing BMPs to improve water use efficiency across the State.

Commercial, Industrial, and Institutional Water Users

CII-BMPs implemented by CII water users or associated property owners or managers that can result in improvement of water use efficiency are hereinafter referred to as "CII Water User BMPs." These CII-BMPs can include:

- **Planning and assessment BMPs**, such as water assessments or audits to identify water-saving practices; potential cost-effectiveness and return on investment (ROI) analyses to determine the feasibility of potential improvements and how long it would take to pay back the initial cost; and water management plans to provide a pathway to implement water-savings practices.

  It should be noted that these BMPs alone do not improve water use efficiency – the identified improvements must be implemented in order to realize the anticipated outcome of improved water use efficiency. However, these planning and assessment BMPs are very useful tools for determining what can be done, identifying cost-effective actions for implementation, and the associated payback periods through avoided costs (e.g., water and sewer bill savings).

- **Water use–specific actions and equipment BMPs**, such as fixture or equipment replacement (e.g., installing automatic shut-off spray rinse nozzles, replacing leaking pipes or fixtures), maintenance procedures (e.g., regular calibration of automatic flush toilets to reduce 'ghost' flushing), and standard operating practices for equipment and processes (e.g., floor cleaning using water brooms, washing only full loads of dishes).

- **Organizational and cultural BMPs** for regular business operations, such as standards for employee practices that reduce water waste (e.g., minimizing water use for hand washing, reporting water waste, and training employees on practices to minimize water waste). Similar to planning and assessment BMPs, organizational and cultural BMPs alone may not increase efficiency of water use; however, they are helpful tools for improving water use efficiency.

Many CII-BMPs are discussed in the 2013 CII Task Force Report and in references used for developing the technical report, *Best Management Practices for Improving Efficiency in Commercial, Industrial, and Institutional Water Use: Key Successes and Challenges in California* (WUES-DWR-2021-16.T.1). The majority of CII water use BMPs discussed in the 2013 CII Task Force Report are ones that can only be implemented by CII water users, such as installation of efficient fixtures and appliances, landscape water use BMPs, training and education of staff, and operations and maintenance of equipment and processes. Some CII Water User BMPs may be implemented by the CII water user in coordination with an urban retail water supplier, such as water audits and water management plans.

The 2013 CII Task Force Report also identified another important consideration: that specific CII-BMPs commonly associated with several similar water use types (e.g., washing dishes, general sanitation, laundry, cooling towers, and others) may have very different outcomes when implemented. An assessment (water survey or audit) is often required to ensure the effectiveness of applying specific CII-BMPs to individual CII water user systems to account for unique conditions that are often present even when water use types are similar.

In general, all CII Water User BMPs in the 2013 CII Task Force Report are technically feasible, have been used in the past, and, in some cases, are cost effective. However, the 2013 CII Task Force Report recognizes that all CII Water User BMPs might not be applicable in all cases. As noted in the 2013 CII Task Force Report (DWR, 2013b):

> *1. **One size does not fit all** – For any given CII sector, subsector, or entity, there may be a dozen potential BMPs. Not all will be applicable. In many cases establishing one BMP could mean that another will not be applicable due to "saving the same water."*
>
> *2. **Every facility is unique** – Analysis of potential payback is unique to each facility and situation. Facilities, even in the same CII sector, vary in their process, equipment selection, and design. This means that what may work at one vegetable processing plant may not be applicable at another; what works in one research laboratory or hotel may not be applicable in another.*
>
> *3. **The BMPs in this document should be used only as a guide** – The intent of this report is to provide compendium of BMPs that are possible measures that CII entities can adopt for their specific situation.*

CII water users often consider the business case for implementing specific CII-BMPs. A frequent consideration is the payback period – how long it takes for cost savings (e.g., reduction in water and wastewater charges) to exceed the initial up-front costs. An additional consideration may be the available staffing resources for implementation,

even for certain CII-BMPs with a favorable ROI. In addition, sometimes property owners may restrict certain changes for different reasons. However, there may also be conditions where CII water users or property owners may implement certain CII-BMPs in exchange for other benefits that may not be related to direct revenues or profits. A number of CII Water User BMPs and their implementation challenges can be found in the technical report, *Best Management Practices for Improving Efficiency in Commercial, Industrial, and Institutional Water Use: Key Successes and Challenges in California* (WUES-DWR-2021-16.T1).

Urban Retail Water Suppliers

The CII-BMPs described above are to be implemented by CII water users and therefore, they do not meet the legislative requirement for DWR to develop CII-BMPs Performance Measures which are, "…actions taken by the urban retail water supplier…" (WC Section 10608.12(n); more specifically, the 2018 Legislation does not directly impose standards and requirements on individual residents or CII water users. Rather, the legislative directive requires DWR to develop a CII-BMPs Performance Measure that identifies "actions to be taken by urban retail water suppliers" that will result in increased water use efficiency by CII water users (WC Section 10608.12(n)), as discussed further below.

Urban retail water suppliers have a role to assist and incentivize implementation of CII-BMPs; however, they often lack proper authority to implement certain CII-BMPs without explicit cooperation from CII water users. Therefore, CII-BMPs that can be implemented by urban retail water suppliers are those they can implement unilaterally without consent from CII water users and associated property owners (or their representative management entities); and those they can implement with either voluntary actions by CII water users or their property owners, or in response to requests (including applicable ordinances and other regulatory requirements), incentives, or other programs by urban retail water users. These are hereinafter referred to as "CII Water Supplier BMPs."

Actions taken by urban retail water suppliers to incentivize, encourage, or assist CII water users in implementing the above-mentioned or other CII-BMPs could be considered for the CII-BMPs Performance Measure.

2.2 Threshold Considerations

The 2018 Legislation is clear that process water is categorically excluded from the CII water use considered for the CII-BMPs Performance Measure (WC Section 10608.12(n)). However, it further directs DWR to recommend CII-BMPs for those CII water users that exceed a recommended size, volume, or other threshold (WC Section 10609.10(b)(3)) to be considered in the CII-BMPs Performance Measure.

DWR considered thresholds based on water use efficiency, meter size, number of CII water users per CII water use type (or classification), and water use volume for the CII-BMPs Performance Measure. The following provides a summary of the thresholds DWR considered and the rationales supporting the use of a volume threshold.

Water Use Efficiency Threshold

A measure of water use inefficiency, as a threshold, would allow urban retail water suppliers to target those CII water users deemed most inefficient in order to maximize water savings potential. Assessing potential inefficiency requires something to quantitatively compare against – a metric (normalized value) that denotes efficient use.

A number of metrics have been studied to determine what may or may not be effective in identifying CII water user water use efficiency (refer to the 2013 CII Task Force Report [DWR, 2013a and 2013b] for details). Certain metrics represent the capacity of CII water users to use water, instead of its actual use (Mitchell, 2019). However, differences in water use between different classifications of CII water users and between individual CII water users within the same classification result in substantial variations in CII water use. This is because CII water use is highly diverse and affected by a number of internal and external factors, including types of CII, production or service volumes and capacity, economic factors, number of employees, operational factors, and other factors (Mitchell, 2019; Keifer et al., 2015). Water use comparisons among various business sectors or between individual CII water users are often not helpful in determining and selecting appropriate metrics for efficiency measurement due to unique site-specific characteristics of CII water use (refer to the 2013 CII Task Force Report [DWR, 2013a and 2013b] for additional information).

In general, water use efficiency metrics require detailed information about the CII water users and facilities, and multiple metrics may be necessary, because there is no single metric that can be used to assess water use efficiency for all CII water user types. For example, building size can be correlated with water use for certain types of CII water use, such as office buildings, when high-quality information is available. However, a significant correlation between building size and office water use in Florida does not mean the relationship can be applied in Sacramento, California (Fedak et al., 2019). Additionally, building size was not well correlated with other types of CII water uses, such as restaurants, because building or facility size does not address factors that could affect water use, such as number of employees, meals being served, seating capacity, and number of customers; all could vary significantly from location to location (Fedak et al., 2019).

The starting place for this type of approach is knowing the classification of CII water users in the service area (Fedak et al., 2019). However, many urban retail water suppliers do not have this information; some urban retail water suppliers classify customers only by meter size and others may only distinguish between residential and

non-residential water users (see *Best Management Practices for Improving Efficiency in Commercial, Industrial, and Institutional Water Use: Key Successes and Challenges in California* [WUES-DWR-2021-16.T.1]). As a result, the 2018 Legislation directed DWR to recommend a Commercial, Industrial, and Institutional Water Use Classification System Performance Measure (CII Classification System PM) to start gathering information for future application. Therefore, a threshold based on water use efficiency is neither practical at this time nor further pursued for developing the CII-BMPs Performance Measure.

Meter Size Threshold

A meter size threshold was considered, because meter size and pressure are directly related to the maximum volume of water flow that can be delivered to water users. In theory, larger meters would serve facilities that use more water. However, meter sizes cannot be correlated with water use or water use efficiency. Meter size can have little relationship to actual water use (indoor and/or outdoor), because meters can be sized for other purposes, such as pressure regulation or to meet fire-flow requirements. Additionally, meters may be sized to accommodate process water, which is categorically excluded from the CII water use performance measures. A CII water user can also be served by one or more meters of various sizes. At best, the meter size is only indicative of potential capacity of water use and, therefore, was not considered further for a threshold recommendation for the CII-BMPs Performance Measure.

Threshold Based on the Number of Water Users by Commercial, Industrial, and Institutional Water Use Category

Stakeholders suggested that the CII-BMPs Performance Measure should emphasize major categories of CII water uses in the service area of an urban retail water supplier. Following this reasoning, one possible threshold is based on the number of water users by category. This may be useful for selective conditions; however, depending on the associated water use, a large number of water users may not suggest a large amount of water use or associated water use efficiency. Therefore, this threshold option was not considered further for recommendation.

Volumetric Threshold

Stakeholders also suggested that the CII-BMPs Performance Measure should focus on major CII water users in the service area of an urban retail water user. Research has shown that as much as 70 to 80 percent of all CII water use is consumed by 10 to 20 percent of CII water users, and these top users may have a greater potential for improving their water use efficiency. In some service areas, a single CII water user can account for 30 to 40 percent of all service area CII water use (Mitchell and Chesnutt 2017). Many urban retail water suppliers with long-standing implementation programs for CII-BMPs may have already targeted the top CII water users by volume (see *Best Management Practices for Improving Efficiency in Commercial, Industrial, and*

Institutional Water Use: Key Successes and Challenges in California [WUES-DWR-2021-16.T.1]). As previously discussed, a high water use volume does not always imply inefficient water use; high water use volume may also include process water that is categorically excluded from consideration for the CII water use performance measures. However, using a volumetric threshold could help address more prominent opportunities for volumetric reduction in water use and could be more appropriate for developing the CII-BMPs Performance Measure.

2.3 Clarified Scope for Performance Measure Development

Based on the above discussion and the legislative directive, DWR considered that the CII-BMPs Performance Measure for urban retail water suppliers should focus on actions that the urban retail water supplier can take to assist, encourage, or incentivize the implementation of CII Water User BMPs. CII Water User BMPs are not part of the CII-BMPs Performance Measure, except where they may be implemented under programs that are part of this performance measure (such as incentive programs that offer rebates for installation of 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). In addition, based on the analysis in the previous section, the threshold for requiring compliance with the CII-BMPs Performance Measure should be volume-based to focus on major CII water users. The threshold can be applied to a specific CII water use classification, or all classifications defined in the CII Classification System PM (see *Recommendations for Commercial, Industrial, and Institutional Water Use Classification System Performance Measure* [WUES-DWR-2021-17]).

DWR also recognized the following principles in developing the CII-BMPs Performance Measure, consistent with the legislative guidance:

- Recommended CII water use performance measures, including the CII-BMPs Performance Measure, must be consistent with the 2013 CII Task Force Report (WC Section 10609.10(c)).

- Two specific CII Water User BMPs are mentioned in legislation: water audits and water management plans. However, DWR's recommendation is not limited to these, nor is DWR required to include them in its recommendations. These two CII Water User BMPs, along with many others identified in the 2013 CII Task Force Report and other references, cannot be implemented unilaterally by urban retail water suppliers without explicit cooperation from CII water users.

- DWR's recommended CII-BMPs Performance Measure should allow flexibity and customization for local conditions. Although technically feasible, CII-BMPs identified in the 2013 CII Task Force Report may not always be cost-effective or

able to be implemented, due to the wide diversity of characteristics of CII water use.

Except for outdoor irrigation of landscape areas with DIMs (or equivalent technologies) in connection with CII water use, CII water use is not part of the quantitative reporting requirements for the UWUO. However, an urban retail water supplier's progress towards implementing CII water use performance measures, including the CII-BMPs Performance Measure, is part of the annual reporting requirements for the Annual Water Use Report.

Although process water is excluded from consideration for CII water use performance measures, DWR encourages urban retail water suppliers working with CII water users to continue exploring means to improve process water use efficiency.

2.4 Relationships to Other Commercial, Industrial, and Institutional Water Use Performance Measures

DWR developed the CII water use performance measures to be mutually supportive and for integrated implementation, as discussed in *Summary of Recommendations for Commercial, Industrial, and Institutional Water Use Performance Measures* (WUES-DWR-2021-15). The following describes the key connections among the CII-BMPs Performance Measure and other CII water use performance measures.

The CII-BMPs Performance Measure is related to the other CII water use performance measures in that the conversion of mixed-use meters for landscape irrigation to DIMs (or equivalent technologies) will eventually change the way some CII water users account for their landscape water use. DWR also anticipates that the CII water use data collected by urban retail water suppliers per the CII Classification System PM could be used to help them identify CII users or user types most likely to benefit from targeted CII-BMPs for improved CII water use efficiency.

Commercial, Industrial, and Institutional Water Use Classification System Performance Measure

When implemented, the CII Classification System PM will facilitate data-gathering by urban retail water suppliers to better understand water use organized by CII water use category in their service areas, along with the corresponding effectiveness of various practices for improving water use efficiency. The CII Classification System PM will also facilitate consistent reporting of CII water use on an urban retail water supplier level throughout the State (see *Recommendations for Commercial, Industrial, and Institutional Water Use Classification System Performance Measure* [WUES-DWR-2021-17]). The CII-BMPs are applicable to most, if not all, CII water use; the data and

implementation results by category would help urban retail water suppliers to refine their strategies and better connect various CII-BMPs to different categories of CII water use for more effective implementation.

Conversion Threshold Performance Measure

The CII-BMPs Performance Measure is related to the Conversion Threshold Performance Measure (Conversion Threshold PM), in that the conversion of mixed-use meters for landscape irrigation to DIMs (or equivalent technologies) will eventually change the way some CII water users account for their landscape water use. Under the Conversion Threshold PM, urban retail water suppliers must convert large landscapes served by mixed-use meters exceeding the conversion threshold to a DIM (or equivalent technology), or implement the In-Lieu Technologies Performance Measure (In-Lieu Technologies PM) (see *Recommendations for Dedicated Irrigation Meter Conversion Threshold for Commercial, Industrial, and Institutional Outdoor Irrigation Water Use Performance Measure* [WUES-DWR-2021-18] and *Recommendations for In-Lieu Technologies for Dedicated Irrigation Meters for Commercial, Industrial, and Institutional Outdoor Irrigation Water Use Performance Measure* [WUES-DWR-2021-19]).

The following two conditions are worth noting:

- If an urban retail water supplier converts a mixed-use meter for CII landscape irrigation to a DIM (or equivalent technology), the water use is then subject to CII-DIMWUS, and classified under its own category in the recommended CII Classification System PM. In other words, the water use is not subject to the In-Lieu Technologies PM or the CII-BMPs Performance Measure. However, certain CII-BMPs would still be beneficial to landscape irrigated with a DIM (or equivalent technology). Therefore, urban retail water suppliers are encouraged to include landscape irrigation with a DIM (or equivalent technology) in their the CII-BMP programs that may also be included in the CII-BMPs Performance Measure.

- If a CII water user reduces a landscape area irrigated by a mixed-use meter below the conversion threshold, that landscape is no longer subject to the Conversion Threshold PM. However, the remaining landscape area is subject to the CII-BMPs Performance Measure and other CII water use performance measures.

Commercial, Industrial, and Institutional Water Use Best Management Practices In-Lieu Technologies Performance Measure

Under the Conversion Threshold PM, if a CII water user opts to use in-lieu technologies for compliance purpose, the associated water use is subject to the In-Lieu Technologies PM. As a result, many landscape BMPs are included in the In-Lieu Technologies PM and, thus, the water use is subject to the CII-BMPs Performance Measure as well (see *Recommendations for In-Lieu Technologies for Dedicated Irrigation Meters for*

Commercial, Industrial, and Institutional Outdoor Irrigation Water Use Performance Measure [WUES-DWR-2021-19]).

3.0 Approach

Per the WC, DWR was directed to study, investigate, and make recommendations on urban retail water supplier CII-BMPs for improving CII water use efficiency. To that end, DWR engaged stakeholders and contracted with Maddaus Water Management to prepare a technical report to establish an understanding of current CII-BMP implementation across the State and to evaluate implementation considerations. This technical report, *Best Management Practices for Improving Efficiency in Commercial, Industrial, and Institutional Water Use: Key Successes and Challenges in California* (WUES-DWR-2021-16.T1), will serve as a reference for urban retail water suppliers and is included in DWR's Recommendation Package. Where appropriate, the information gathered, and results of the technical report are incorporated into this report by reference.

3.1 Stakeholder Process

Consistent with the legislative directive, DWR used a public process involving diverse stakeholders in the review and development of CII water-use related topics. 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]). More focused stakeholder engagements specifically for CII performance measures began in October 2020, with periodic meetings and workshops held through early 2022.

DWR established two working groups to assist in implementing the 2018 Legislation, and these groups formed the base of the stakeholder involvement process that included State agencies, cities, counties, urban retail water suppliers, environmental organizations, professionals, and other stakeholders and interested parties. The Water Use Studies Working Group was established in July 2019 to inform DWR in developing water use studies for setting up standards, variances, and performance measures. Concurrently, the Standards, Methods, and Performance Measures Working Group was also established to provide input to DWR on developing the structure and specifications of water use efficiency standards, variances, methodologies, and performance measures. However, due to the close relationship between research on different CII performance measures and the implementation of urban water use efficiency standards and variances, members of both working groups were invited to participate in the same stakeholder meetings and workshops. DWR opened working group meetings and workshops to the public to allow for broader participation in and input from other stakeholders, interested parties, and individuals.

During the working group meetings, presentations and discussions covered the legislative background, DWR research into existing CII Water Supplier BMPs, and the

proposed CII-BMPs approaches to the performance measure. Stakeholder presentations were designed to provide information to a large number of participants. A survey was also conducted from March 22, 2021, to May 3, 2021, to solicit the feedback from the working groups on the topic of CII Water Supplier BMPs' applicability, usefulness, and list completeness.

Working group members and other participants had ample opportunities to learn about the approach to the CII-BMPs Performance Measure considered by DWR and to review and provide feedback on the annotated outline of the related technical report, *Best Management Practices for Commercial, Industrial, and Institutional Water Use* (WUES-DWR-2021-16.T1). They provided input on implementation, such as resource needs (staff) and other implementation considerations.

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.

3.2 Principles

Within the context of CII water use performance measures developed per the 2018 Legislation, the CII Water Supplier BMPs discussed in Section 2 are CII-BMPs that can be implemented by the urban retail water suppliers unilaterally, per WC Section 10608.12(n). As previously noted, individual CII Water User BMPs are not directly part of the CII-BMPs Performance Measure, because implementation of those BMPs requires CII water users' commitments and authorizations. However, it is the actions taken by individual CII water users that achieve the desired water use efficiencies. Therefore, the CII-BMPs Performance Measure should identify what actions the urban retail water suppliers can take to encourage individual CII water user implementation of CII Water User BMPs. Significant stakeholder input throughout the process emphasized the importance of developing a performance measure that: (1) is able to be implemented; (2) is measurable; and (3) holds the urban retail water suppliers accountable regarding the implementation of the BMPs.

DWR recognized that the broad diversity in CII facility types and sizes, equipment types, facility age, quantity and rate of operations, and number of fixtures makes addressing water use efficiency challenging in the CII sector. CII water user characteristics and end uses are not necessarily comparable across CII types or even within the same CII water user category, depending on a number of factors, including intensity of production or services offered (Mitchell, 2019). DWR has also received input from working groups and stakeholders about these challenges, which served as the foundationl for developing a common understanding of available CII-BMPs.

As detailed in the technical report, *Best Management Practices for Commercial, Industrial, and Institutional Water Use* (WUES-DWR-2021-16.T1), and the 2013 CII Task Force Report, there is no single approach to implementing CII-BMPs due to the wide variability in CII water use and user characteristics. Generalizing the effectiveness for CII-BMPs is not supported by real-world conditions; rather, understanding these end uses is crucial for determining water efficiency and conservation opportunities.

DWR also recognized that the setting and sophistication of practices of urban retail water suppliers can vary significantly, resulting in substantial differences in their abilities to facilitate or support the implementation of CII-BMPs. The number of CII water users within urban retail water supplier service areas varies from about 27 total CII accounts (0.6 percent of accounts) to more than 84,000 total CII accounts (11 percent of accounts). The makeup of accounts in each urban retail water supplier's service area will affect the decision for targeted CII sectors and groups for maximizing the effectiveness and efficiency in resource investment. Stakeholder input throughout the development process was consistent in requesting local flexibility and ability to customize their own programs and actions. Refer to *Best Management Practices for Commercial, Industrial, and Institutional Water Use* (WUES-DWR-2021-16.T1) for additional details regarding variability of CII sectors and water use.

Given the above discussion and findings, DWR considered that the recommended CII-BMPs Performance Measure should allow urban retail water suppliers to design programs and actions that can be effective based on the characteristics and setting for CII water users in their service areas, including the selection of specific CII Water User BMPs to be included in these programs and actions – which could become the basis for the CII-BMPs Performance Measure.

3.3 Evaluation of Commercial, Industrial, and Institutional Water Use Best Management Practices for Implementation by Urban Retail Water Suppliers

As previously mentioned, CII Water User BMPs, by themselves, are not part of the CII-BMPs Performance Measure; however, they could be a part of programs and actions by urban retail water suppliers (i.e., CII Water Supplier BMPs). This section provides a consolidated discussion of review and assessment of available concepts for CII Water Supplier BMPs.

Methodology

DWR conducted extensive research on CII-BMPs, including CII Water User BMPs and CII Water Supplier BMPs, in order to identify suitable CII-BMPs to be included in the

CII-BMPs Performance Measure. Stakeholder input was also considered throughout the process.

Depending on local conditions and available resources, the CII Water Supplier BMPs can be in different forms when implemented. The discussion herein on the CII Water Supplier BMPs is to be representative, focusing on their potential utility and their potential adequacy for the CII-BMPs Performance Measure. The discussion draws information from literature and many studies, including several key references with consolidated information, such as the 2013 CII Task Force Report and AWWA's *Manual M52 Water Conservation Programs – A Planning Manual, 2nd Edition* (Maddaus et al., 2017). Particularly, *Best Management Practices for Commercial, Industrial, and Institutional Water Use* (WUES-DWR-2021-16.T1) includes the most recent compilation of CII Water Supplier BMPs and case studies, and is, therefore, incorporated by reference without further specific attribution.

As DWR focuses on the cited CII-BMPs, terminologies used for referencing certain types of CII-BMPs may, where appropriate, be different from those in referenced literature. The major categories of CII-BMPs considered by DWR are listed below and are discussed in further detail in this section.

- Water assessments (usually known as water audits; one CII-BMP identified in WC Section 10609.10(b)(3)).
- Water management plans (another CII-BMP identified in WC Section 10609.10(b)(3)).
- Outreach, technical assistance, and education.
- Incentives.
- Landscapes.
- Collaboration and coordination.
- Operational practices.

Through its investigation and research, DWR recognizes that these CII-BMPs cannot be implemented alone; and evidence suggests that successful implementation relies on an effective combination of these CII-BMPs for customized implementation, discussed later in this section.

Water Assessments

Water assessments, also known as "water audits" per WC 10609.10(3)(b), are considered one example of a CII-BMP that could be implemented as part of the CII-BMPs Performance Measure. For public acceptability, the terms "water assessment" or

"water survey" are increasingly used more frequently to appropriately and positively convey the goals of understanding water use and water efficiency within a CII facility, and identify potential areas of improvements for the facility owner or the CII water user. DWR recognizes the benefit of using a more modern term to facilitate positive communication. Therefore, the term "water assessment" is used in lieu of "water audit" in the remaining portions of this report and in DWR's recommendations.

Concept Description and Anticipated Outcome

The goals of a water assessment for the CII water user are to:

- Quantify how water is being used.
- Identify what opportunities exist for reducing water use.
- Calculate the potential payback for each opportunity identified.

Water assessments can vary in detail and purpose, from a brief facility survey to identify possible savings and costs for water efficiency improvements, to a more detailed analysis with complete savings and cost calculations, including estimates of the ROI. The assessment process generally consists of four stages:

1. Data collection.
2. Site walk-through.
3. Analysis, including payback calculations.
4. Report generation, including quantified water-efficient project recommendations.

The site walk-through is an essential component of the assessment for determining how water is being used and for identifying potential water use efficiency opportunities. This step requires authorization to conduct the site walk-through by the CII water user, property owner, and/or property manager. Water assessments can also assist CII water users with locating medium to large leaks at their CII property, which can not only save water, but also potentially prevent significant infrastructure damage. CII water users usually consider the ROI as part of the business case for potential improvement; however, the length for an ROI may vary. In some cases, non-monetary benefits may also be considered. In addition, where implemented successfully, water assessments performed as a collaboration of urban retail water suppliers and CII water users can help to build a trusted relationship.

Assessments for Incorporation in Performance Measure

Urban retail water suppliers and stakeholders provided a strong reminder that water assessments cannot unilaterally be implemented by urban retail water suppliers without

specific cooperation and consent from CII water users or their onsite representative. They also suggested that water assessments usually require specific expertise that is not typically within the organization of CII water users or urban retail water suppliers.

DWR considered that water assessments are within the category of CII Water User BMPs that can be very effective for individual CII water users. Therefore, it is not a CII-BMP that can be readily included in the CII-BMPs Performance Measure without supporting actions. The role of urban retail water suppliers is to inform and facilitate the implementation of such a CII-BMP, where possible. Urban retail water suppliers may implement a program that offers technical assistance for interested CII water users, or they may include the completion of a water assessment as a requirement for a CII water user's eligibility to participate in an incentive program offered by the urban retail water suppliers. Thus, these programs would be considered actions implemented by urban retail water suppliers for improvement of water use efficiency in the CII sector, consistent with the requirements for the CII-BMPs Performance Measure.

Water Management Plans

Preparation of water management plans (WMP) for CII water users is another example of a CII-BMP included in WC 10609.10(3)(b) that could be implemented as part of the CII-BMPs Performance Measure.

Concept Description and Anticipated Outcome

Generally, WMPs can be developed by CII water users or for CII water users through professional services that may or may not be facilitated by urban retail water suppliers. The content of a WMP includes the identified water uses and opportunities for improvement in water use efficiency. An implementation plan and associated financial strategies are often included. A CII water user water management plan, which is prepared for a specific CII water user and often for a specific facility or location, is hereinafter referred to as a "CII Water User WMP" in the remaining portions of this report and in DWR's recommendations.

A simple water use assessment report may be sufficient for a small, less complex facility or site; but a custom CII Water User WMP can be more helpful for CII water users with complex site conditions and facilities. From the viewpoint of urban retail water suppliers, the implementation of this CII-BMP is a customer-driven process. The role of urban retail water suppliers is to assist and facilitate the implementation, including recruiting professional services on behalf of CII water users throughout their service area for cost efficiency.

Assessments for Incorporation in Performance Measure

Similar to water assessments discussed earlier, CII Water User WMPs can be a useful tool for improving CII water use efficiency if CII water users or their representative for

whom the WMPs are prepared implement the identified improvement actions. This CII-BMP is another example that urban retail water suppliers cannot implement unilaterally without the explicit consent and cooperation of CII water users or their representative. A CII Water User WMP without commitments of the CII water user for implementation would result in no meaningful improvement of water use efficiency. Therefore, similar to water assessments, CII Water Use WMPs cannot be assessed alone for their improvement of water use efficiency, or for consideration as a stand-alone as part of the CII-BMPs Performance Measure.

Outreach, Technical Assistance, and Education

Most urban retail water suppliers have some form of outreach, technical assistance, and/or education programs provided either by the urban retail water supplier itself or through efforts of a regional alliance or entity. They can be part of a broader outreach, technical assistance, and education program, or a stand-alone one, depending on factors important to the urban retail water supplier and involved parties where applicable.

Concept Description and Anticipated Outcome

Outreach and education programs are primary actions urban retail water suppliers can take for improving CII water user water use efficiency. The success of an outreach or education program, however, depends on many factors, including the methods for engagement, the frequency and content of communication, choices of targeted audience, types of CII water users in the service area, and other local factors. Additional factors also include whether its connection to other programs provide certain incentives for attention and participation. Technical assistance CII-BMPs can include tools for assisting CII water users, such as training or tools to calculate payback periods and cost-effectiveness, guidance on how to conduct a water assessment, and tools for tracking and managing water use.

Assessments for Incorporation in Performance Measure

One major challenge for education and outreach undertaken by urban retail water suppliers is to reach the targeted audience. The primary contact for a CII water user is often for business purposes and may not be the party who is familiar with their water use conditions, or authorized to make changes in equipment, operations, or policies for improving water use efficiency. Without meaningful engagement with the targeted audience within the organization of CII water users, the outcome of education and outreach activities is uncertain.

For technical assistance, urban retail water suppliers may be limited by resources and lack technical expertise required for intended technical assistance to CII water users. Therefore, where resources are available or supported by other sources, such as State or regional financial assistance, urban retail water suppliers could more realistically

provide means to connect CII water users with qualified professional services, if the CII water users take on the offer and, subsequently, implement improvement actions.

Overall, outreach, technical assistance, and education are sound, potentially foundational CII-BMPs that can be provided by urban retail water suppliers. However, by themselves, it is challenging to demonstrate the effectiveness or efficiency of these activities for water use efficiency improvements without overly generalized considerations.

Incentives

Incentives are additional funding, rewards, and other benefits beyond what CII water users have and control that are provided to motivate CII water users to improve their water use efficiency. Incentives are often viewed as the counterpart of a regulatory approach to realizing long-term or short-term behavior changes.

Concept Description and Anticipated Outcome

There are many types of incentives that can be used, including: economic incentives, such as pay-for-performance and rebate programs; noneconomic incentives, such as recognition and branding programs; and, potentially, regulatory and administrative incentives, such as ordinances and inspections. These incentive types are discussed below.

- **Economic Incentives:** A simple example of such incentive programs is a rebate program for fixture and equipment upgrades or landscape conversion. It is relatively straightforward to demonstrate improved CII water use efficiency based on the water savings associated with changes of fixtures, appliances, and other equipment, and the effects are generally long lasting. The potential water saving for landscape conversion is straightforward for short-term considerations, especially converting from lawns to drought-tolerant landscapes. Whether the level of water-saving can last depends on many factors, including CII water user behavior and efforts in maintenance; however, overall, it is still positive.

  Economic incentives can also include mechanisms such as fees or fines for excessive water use or non-compliance with ordinances and permits, in addition to structured water rates designed for water use efficiency. Fees and fines can directly result in improved water use efficiency, whereby CII water users take action to avoid the extra cost. Rate structures designed to target water waste, such as budget-based rate structures, can be monitored to demonstrate water efficiency improvements.

- **Noneconomic Incentives:** In addition to profitability or monetary considerations as discussed above, noneconomic incentives, such as recognition programs, can incentivize improvement of CII water use efficiency if reputation and brand are

substantial components of the CII water user's business and market strategies. Urban retail water suppliers, including East Bay Municipal Utility District, have seen positive responses from CII water users when providing certifications for efficient water use or as part of the broader green business initiative to recognize the awarded CII water users as industrial leaders in water use efficiency or in fulfillment of environmental stewardship or corporate social responsibility.

- **Regulatory and Administrative Incentives:** Regulations and administrative procedural requirements are generally not considered incentives, as CII water users are required to comply with existing laws and regulations, including local ordinances. Often ordinances (e.g., water waste ordinances), permitting requirements, and other local regulatory requirements can provide sufficient incentives for CII water users to implement certain CII-BMPs if proven to be more advantageous than taking alternative actions. One example of such CII-BMPs includes the inspection requirement for a new installation or permitted landscape rehabilitation to verify its compliance with the State's Model Water Efficient Landscape Ordinance (MWELO) (or the local Water Efficient Landscape Ordinance) for water-efficient landscaping. Another example is to require, upon a CII property sale, an inspection and a certification that all fixtures and appliances on the property meet the water use efficiency requirements in the California Building Standards Code (California Code of Regulations [CCR], Title 24) before new service (e.g., water, sewage, or electricity services) can be provided.

Assessments for Incorporation in Performance Measure

The ability of an urban retail water supplier to offer incentive programs for CII water use efficiency improvements and the types of incentive programs varies significantly and is tied closely to its financial capacity and regional setting. In recent years, the State has also invested significantly to provide financial incentives for improving CII water use efficiently, directly to CII water users or indirectly through urban retail water suppliers or other organizations. Nonetheless, urban retail water suppliers would need additional resources to manage and finance the rebates for sufficient market penetration to make a difference.

Consistent with stakeholder input, many of these types of rebate programs have reached a significant market penetration rate and gradually became less effective or functional. Therefore, while it is still an important component of CII-BMPs for improving water use efficiency, the results may vary significantly from one urban retail water supplier to another. Urban retail water suppliers should gauge the remaining capacity for a rebate program (e.g., inefficient toilets) to better determine the adequate investments (e.g., funding and resources) and overall program design, including campaigns and other supporting activities. Adequate tracking of which CII water users have already participated in each type of incentive can help inform urban retail water suppliers about whether continued offerings would provide additional water use

efficiencies, or if there is essentially little remaining capacity for that incentive. If possible, certain surveys or other means of identifying penetration rates would be required. In other words, a more sophisticated approach is necessary for mature rebate markets, creating additional demands on resources and capacities.

Noneconomic incentive programs are an area that urban retail water suppliers could explore, especially in the current era when corporate social responsibilities are significant considerations in the overall business planning for major corporations. This may not be effective for smaller CII water users, but could be an integral part of the overall program.

The challenges for implementing economic incentives that involve financial instruments such as fees or fines for non-compliance with ordinances and permits are similar to those of regulatory and administrative incentives. They are very attractive; however, they often require authority beyond those of urban retail water suppliers. Therefore, the concept development and implementation cannot be successful without cooperation, coordination, and collaboration with other local governmental entities, as discussed later in this section.

Landscape

CII landscape irrigation water use is often a significant water use that urban retail water suppliers can target for improving CII water use efficiency.

Concept Description and Anticipated Outcome

CII Water Supplier BMPs for landscape areas can include encouraging water efficient landscapes and irrigation management practices through programs that offer or provide turf removal or replacement, irrigation system inspection and maintenance, irrigation scheduling training, new development landscape inspection, workshops and training on landscape water use efficiency, and others. CII landscape management is often conducted by a third-party landscape contractor, creating additional opportunities for consistent implementation and proper maintenance.

Assessments for Incorporation in Performance Measure

Large CII landscapes irrigated with mixed-use meters are subject to the recommended landscape area threshold for converting to 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 additional information.

Landscape areas on CII properties are often the most public-facing component of the business. The corresponding CII water user may have different considerations in its landscape design and purposes. Urban retail water suppliers would need to be strategic in approaching major CII water users for implementing landscape CII-BMPs in addition

to assessing the costs and benefits. Branding and other similar motivations that were discussed under the noneconomic incentive BMPs earlier could have a significant role in a successful collaboration between the urban retail water supplier and CII water user to achieve a win-win situation.

Landscape CII-BMPs should be implemented programmatically with other CII Water Supplier BMPs, such as education, outreach, training, and incentives, in order to be effective. Regardless, it is estimated that the capacity for landscape CII-BMPs remains significant and can achieve significant water savings in many urban retail water supplier service areas. 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 additional details on landscape CII-BMPs and associated considerations for water use efficiency.

Operational Practices

Urban retail water suppliers can review their own operations, including tools they use to identify actions to improve CII water use efficiency, improve records for implemented CII Water User BMPs and CII Water Supplier BMPs, or areas of collaboration with other local governmental entities or regional organizations.

Concept Description and Anticipated Outcome

These CII Water Supplier BMPs can include necessary or planned internal operational practices, such as system infrastructure changes (e.g., smart meter replacement programs), billing or data collection procedures (e.g., data tracking, analysis, and reporting improvements), processes or procedures for collaboration and communication (e.g., formal process to coordinate with local land use authority for MWELO reports), or other operational BMPs to facilitate CII-BMP program implementation and evaluation.

Several urban retail water suppliers have identified Advance Meter Infrastructure (AMI) as a high-priority infrastructure improvement for detecting leaks, which is effective in improving CII water use efficiency. Implementation of AMI targeting a specific subset of CII water users may be cost-effective when each CII water user is served by a single meter. AMI can also be combined with a customer-facing portal through which customers can access and self-manage their usage, facilitating water use reduction and enhancing customer service and communication.

Internal tools and formalized procedures for tracking metrics associated with an implementation program for CII-BMPs can assist in annual reporting on progress. Coupled with identification of the individual CII water user or address, along with information about the CII water user that may provide indications of their water use efficiency, can also help urban retail water suppliers know where to focus their efforts and resources.

Assessments for Incorporation in Performance Measure

Urban retail water suppliers are encouraged to regularly review their practices for efficiency and better alignment with current and emerging conditions, including climate and regulatory changes. The levels of sophistication for operation are very different among urban retail water suppliers – mostly are driven by necessity. Improvements in practices and processes usually requires investment and, thus, urban retail water suppliers may need to set up a longer-term plan for developing resources and capacity and for implementation.

For example, AMI is effective in improving the understanding and management of water use on the account level, and the data could be extremely helpful for future reporting and assessment purposes. However, AMI is expensive and may not be feasible for all urban retail water suppliers. Although, with perceivable benefits to improve CII water use efficiency, the ability for implementation could vary significantly among urban retail water suppliers.

Collaboration and Coordination

Many urban retail water suppliers have opportunities to collaborate and coordinate with other local government agencies, non-profit organizations, and other entities for various reasons. Some could be required by law and regulations, some are voluntary, and some could be built upon shared interests and economics of scale for implementation actions.

Concept Description and Anticipated Outcome

Without constraining potential variations of collaboration and coordination that an urban retail water supplier can structure, there are at least three major types of collaboration and coordination that could help improve CII water use efficiency.

- **Cross-authority collaboration:** There are many government agencies and other entities that have either management authorities or partnership relationships with CII water users; urban retail water suppliers do not control all permits and conditions related to CII water use onsite. In some cases, the different authorities may simply reside in a different department within the same agency. Many previously discussed CII-BMPs require cooperation from different local government agencies, including city and county land use agencies and permitting agencies for certain actions by CII water users. Urban retail water suppliers could partner with these local government agencies to set forth protocols and ordinances to streamline and formalize requirements that contribute to administrative and management goals of both agencies, including CII water use efficiency.

  This type of cross-authority collaboration and coordination could also improve the enforcement actions required by existing law and requirements (e.g.,

requirements for inspection and certification for onsite fixture upgrade upon change of CII property ownership). If done properly, this could help create a culture of water use efficiency locally and encourage commitments of CII water users to implement CII Water User BMPs.

For example, the City of Santa Rosa adopted a water waste ordinance in 1999 to: (1) prohibit waste of water due to breaks or leaks in the water delivery system or water use in outdoor areas resulting in runoff; (2) require all new water services using evaporative cooling systems, decorative water fountains, conveyer car washes, and industrial clothes washers to be equipped with water recycling or reuse systems; and (3) provide the City of Santa Rosa with the authority to discontinue service if the water waste is not corrected (City of Santa Rosa, 2021). Therefore, Santa Rosa Water leverages this water waste ordinance to provide additional incentive for CII water users to address suspected leaks, and their AMI data provides documentation for enforcement of the ordinance as well as for outreach and education on leaks for CII water users.

- **Cross-urban retail water supplier collaboration:** Financial, administrative, and community benefits are also possible through regional collaboration and coordination for data sharing, program administration, enforcement of actions, and education and outreach. Individual urban retail water suppliers may experience more limitations in their investment in the above-mentioned CII-BMPs to improve CII water use efficiency, because this is not the only area in which urban retail water suppliers would need to invest for achieving the goals of the 2018 Legislation for long-term drought resilience. However, a regional approach, where multiple urban retail water suppliers and potentially small water suppliers within the region, could potentially leverage the economics of scale to break down the barriers for implementation by reducing the administrative costs, while also providing more services and opportunities for water use efficiency, including CII water use efficiency.

  A regional approach has been implemented in many areas, including Southern California, Bay Area, and Sacramento regions, and it can be successful with or without a wholesale-retail relationship among collaborating agencies. This approach could also promote consistent messages and implementation across a region to reduce confusion and level business competitiveness among CII water users. With conforming contracting authorities and requirements, regional collaboration and coordination could also be used to establish one or more preferred vendors who would perform necessary professional services, including construction and maintenance at a discount rate.

- **Collaboration with other entities:** Federal, State, and municipal agencies across the country continue to lead in incorporating energy efficiency and overall sustainability by following federal mandates and green building guidelines in the

design, construction, and renovation of federal facilities. Most states and many major cities have also incorporated green requirements into their internal building requirements for new construction. The State adopted the Green Building Standards Code in 2008 as Part 11 of the California Building Standards Code (CCR, Title 24), including specific requirements for water use efficiency and conservation.

Due to the trend in contracting, regulatory frameworks, and overall heightened social awareness of sustainability, there are many certification programs for resource use efficiency (e.g., energy and water) and general sustainability for buildings and products, including Energy Star®, WaterSense, and many others (e.g., the California Green Business Network partnered with East Bay Municipal Utility District). Collaboration and coordination with these certification programs could allow urban retail water suppliers to establish the previously mentioned noneconomic incentives for CII water use efficiency, and significantly leverage the resources and channels established by these programs for outreach, education, and advocacy. Nonprofit community organizations may also be helpful in marketing CII water use efficiency and, in some cases, providing administrative services for implementation through grants and other sources of funding.

Assessments for Incorporation in Performance Measure

DWR considers collaboration and coordination CII-BMPs to be critically important to improve CII water use efficiency for all urban retail water suppliers, regardless of their individual resources and capacity. However, the premise of these CII-BMPs relies on a functional CII-BMPs program implemented by individual urban retail water suppliers to leverage the collaboration and coordination and maximize the ROI.

In selecting certification programs for partnership, urban retail water suppliers should have a complete understanding about the organization making the assessment (e.g., certification) and associated assessment methods to ensure they are science-based, transparent, objective, and progressive to fit the needs of urban retail water suppliers and avoid rewarding “business as usual.”

3.4 Findings

The exclusion of quantifying most CII water use from an urban retail water supplier’s UWUO recognizes the diversity and complexity associated with CII water use. The legislative direction for the CII-BMPs Performance Measure is to focus on actions taken by urban retail water suppliers to improve CII water use efficiency. Therefore, CII Water User BMPs, by themselves, cannot be considered in the CII-BMPs Performance Measure. In general, they cannot be implemented unilaterally by urban retail water suppliers without explicit cooperation and consent by CII water users. However, they

can be part of the actions taken by urban retail water suppliers, because without implementation by CII water users, the improvement of CII water use efficiency would not be realized.

Through research and review of available literature and case studies, DWR evaluated many types of CII-BMPs for constituting actions by urban retail water suppliers that could be considered in the CII-BMPs Performance Measure. Additional stakeholder input was also incorporated into DWR's evaluation. The following provides a summary of findings that form the basis for the recommendations detailed in Section 4.

Need for a Customizable Implementation

Due to the diversity of CII water use and the differences among CII water users within seemingly similar uses, the effectiveness of any CII-BMPs cannot be generalized statewide or even across different sectors or classifications. Unique location conditions, including weather conditions, land use, and mix of CII water users, could significantly affect the effectiveness of any CII-BMPs or CII-BMP program. The history of CII-BMP implementation and its maturity may also influence the applicability and effectiveness of certain CII-BMPs.

DWR recognized that although 2018 Legislation excludes process water from the requirements for CII water use performance measures, CII water users do not generally meter or measure process water use separately. Urban retail water suppliers could encourage such a practice, but in many cases they need to rely on the total water use, because process water may tie to trade secrets and other confidential practices that CII water users would not disclose.

It would be prudent to rely on the knowledge of urban retail water suppliers about their service area, CII water users, and work to date on CII water use efficiency improvement in order to identify CII-BMPs and accompanying implementation actions. In other words, the CII-BMPs Performance Measure should allow urban retail water suppliers the opportunity to develop a program customized for their conditions and needs, and allow for incorporation of the necessary sequence of actions when certain CII-BMPs are dependent on the implementation of others. It also would be necessary to allow program changes through time to incorporate new or changed conditions, implementation outcomes, and lessons learned.

Lastly, it is necessary to recognize that, currently, not all urban retail water suppliers have a well-developed program for CII water use efficiency. CII-BMPs permissible under the CII-BMPs Performance Measure may need time and resources to develop, and the outcome may not be realized immediately. Even for those who have a long history of program implementation for CII water use efficiency, adjustments are likely required to conform to the requirements of the CII-BMPs Performance Measure in conjunction with those of other CII water use performance measures.

Effectiveness of a Programmatic Approach

The review of various CII-BMPs for consideration in the CII-BMPs Performance Measure suggests that rarely can one CII-BMP alone be implemented to realize the anticipated outcomes for CII water use efficiency improvement. While a customized program formulation and implementation is allowed, it is important for urban retail water suppliers to demonstrate how the various components in the program can support each other and, collectively, achieve CII water use efficiency improvements. The overall coordinated design and administration could also reduce overall costs.

In some cases, different CII-BMPs can be combined for a certain initiative, especially a short-term one. For instance, pay-for-performance programs are customized programs that combine outreach and education with incentive programs to improve water use efficiency. In these programs, CII water users receive an incentive based on how well they perform in terms of water saving (i.e., water use efficiency improvement while maintaining existing production).

Budget-based rate structures that have been implemented in certain part of the State can also be considered as a CII-BMP that incorporates many CII-BMPs. Water use efficiency can be incorporated and agreed-upon when negotiating a budget and, thus, the resulting water use can be used as an indicator of water use efficiency if other conditions remain constant. Communication with CII water users when actual water use exceeds the budget also provides for outreach and education functions and generates opportunities to identify the cause of increased use. The resulting reduction in water use is rewarded by the avoided cost of paying for water use in high-rate tiers when exceeding the budget. While DWR recognizes the benefits of a budget-based rate structure for improving CII water use efficiency (or overall urban water use efficiency), this practice is not for everyone, and a successful budget-based rate structure requires significant planning for change and many years to mature.

Efficiency in Focusing on Major Water Use

It is a relatively common observation among urban retail water suppliers that most CII water use is from the top 20 percent of CII water users in their service area. Therefore, from an effectiveness standpoint for CII-BMP implementation, to achieve CII water use efficiency improvement, focusing on top water users can be a reasonable and effective approach. This approach could affect the design and execution of a CII Water Use Efficiency Implementation Program as CII-BMPs suitable for large water users may be different or less effective for those smaller ones.

With the implementation of the CII Classification System PM, the approach of focusing on top water users can also be paralleled to apply to high water use CII sectors or CII water use classification categories (i.e., focusing on top CII water use classification categories). Generally, DWR expects that effective CII-BMPs for each sector (or classification) within a service area are likely to be similar, although DWR also

recognizes that there still could be differences among CII water users within the same sector (or classification).

One caution for applying this approach is that, in many cases, process water use cannot be easily separated from the total use by a CII water user. Urban retail water suppliers should work closely with CII water users to understand the nature of reported water use and adjust the use of this approach as needed.

Benefits of Regional Multifaceted Collaboration and Coordination

With a functional program for CII-BMP implementation, urban retail water suppliers should seek potential regional collaboration and coordination. As previously mentioned, there are many different forms and objectives for collaboration and coordination. Urban retail water suppliers could customize the engagement based on their needs and priorities.

A regional implementation is consistent with many State initiatives for water management and an important strategy to leverage limited resources and capacity of each urban retail water supplier to the maximum extent practicable. Therefore, the CII-BMPs Performance Measure should allow regional implementation; however, as the compliance determination is on individual urban retail water supplier basis, it is important that complete documentation be provided in the Annual Water Use Report.

Adequate Considerations of Technical Feasibility, Financial Feasibility, and Economic Productivity

DWR recognized that the diversity among locations, sectors, and CII water users within sectors does not lend itself to quantified standards or metrics for CII water use efficiency. As a result, while all CII-BMPs identified in the 2013 CII Task Force Report are technically feasible, the financial feasibility of or effects on economic productivity for each CII-BMP are difficult to assess.

Per stakeholder input, for CII Water User BMPs, CII water users usually considered the associated financial feasibility – more precisely, the associated business cases that are often beyond the volume and cost of water use and include additional costs for business practices, staff, process requirements, and other factors affecting the productivity of the individual CII water user. With the challenge in characterizing effects on individual CII water users, the resulting effects on economic productivity are even more difficult to measure.

Because the 2018 Legislation directs setting requirements for urban retail water suppliers but not CII water users, and urban retail water suppliers cannot unilaterally implement CII Water User BMPs without explicit cooperation and consent from CII water users, urban retail water suppliers have their own financial feasibility or ROI to consider for their actions. Based on stakeholder input, most urban retail water suppliers

considered that education is foundational and cost effective because it promotes behavior changes. However, the actual water use efficiency improvement relies on implementation of actions by CII water users and, thus, the resulting ROI for urban retail water suppliers is hard to define without the quantifiable improvement.

Another major comment from stakeholders related to financial feasibility and economic productivity is the affordability of water. New requirements for the CII-BMPs Performance Measure, along with other standards, variances, and CII water use performance measures, would likely increase the capacity requirements for urban retail water suppliers and, therefore, potentially increase the resulting rates for residents and CII water users, which affects the affordability. Because affordability is an urban retail water supplier–specific issue, depending on the demographic and CII types within its service area, the detailed analyses are beyond the scope of this study's current efforts.

With the above challenges, it is necessary to incorporate feasible approach for consideration of financial feasibility and economic productivity in developing the CII-BMPs Performance Measure. Such an approach can be found in the 2018 Legislation. The exclusion of process water from the requirements of the 2018 Legislation avoids the unintended impacts on productivity, since process water use can be tied to productivity and profits. DWR found it is prudent to leverage this strategy of avoiding or minimizing economic impacts in developing the CII-BMPs Performance Measure, such that recommendations should include streamlined requirements and outcome-oriented flexible implementation to reduce potential cost burdens for urban retail water suppliers and, potentially, CII water users.

4.0 Recommendations for Commercial, Industrial, and Institutional Water Use Best Management Practices Performance Measure

This section provides DWR's recommendations for the CII-BMPs Performance Measure to be implemented by urban retail water suppliers.

4.1 Conditions for Applicability

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.

This recommended CII-BMPs Performance Measure is subject to additional review, approval, and potential modifications by the State Water Board during the adoption process. Regardless of the outcome, the following foundational conditions remain true:

- The implementation of the CII-BMPs Performance Measure does not restrict urban retail water suppliers from implementing additional CII-BMPs exceeding the requirements or extending targeted CII water users to those below the recommended thresholds of water use volume.

- The implementation of the CII-BMPs Performance Measure, as well as other CII water use performance measures recommended by DWR as part of the Recommendation Package, does not require urban retail water users to report quantitively CII water use, CII water use efficiency, or amount of water saving as a whole or by sector (i.e., classification) as part of their Annual Water Use Report.

The recommended CII-BMPs Performance Measure is to be implemented in conjunction with DWR's recommended CII Classification System PM (see *Recommendations for Commercial, Industrial, and Institutional Water Use Classification System Performance Measure* [WUES-DWR-2021-17]), Conversion Threshold PM (see *Recommendations for Dedicated Irrigation Meter Conversion Threshold for Commercial, Industrial, and Institutional Outdoor Irrigation Water Use Performance Measure* [WUES-DWR-2021-18]), and In-Lieu Technologies PM (see *Recommendations for In-Lieu Technologies for Dedicated Irrigation Meters for Commercial, Industrial, and Institutional Outdoor Irrigation Water Use Performance Measure* [WUES-DWR-2021-19]). The recommended CII-BMPs Performance Measure does not rescind or modify existing requirements for CII-BMP implementation or authorities for approving such actions.

4.2 Specifications for Actions Taken by Urban Retail Water Suppliers

DWR recommends that urban retail water suppliers establish a CII Water Use Efficiency Improvement Program for implementation of the recommended CII water use efficiency performance measures, including the CII-BMPs Performance Measure, with the following specifications. The CII Water Use Efficiency Improvement Program can be a new stand-alone program for CII water use or to augment existing and future programs that urban retail water suppliers may implement to outline actions and anticipated outcomes for improving overall urban water use efficiency and to document progress of implementation.

Categories of Actions

DWR recommends that the following categories of CII Water Supplier BMPs are considered acceptable for the CII-BMPs Performance Measure as actions that can be taken by urban retail water suppliers to improve CII water use efficiency. The following categories of actions describe their intended purpose, but are not intended to provide a comprehensive or prescriptive list of CII Water Supplier BMPs, which often requires customization for implementation or is subject to customized combination by urban retail water suppliers.

- **Outreach, Technical Assistance, and Education** – Practices and actions taken by urban retail water suppliers or through efforts of a regional alliance or entity to inform, educate, and assist the CII water users to improve water use efficiency. These may include, but are not limited to, direct contacts via site visits or phone calls; informative or educational bill inserts; conducting workshops or developing training videos; webpage portals to access information, tools, and rebates; cost-effectiveness analysis tools; commercials or advertisements; grassroots marketing; or community-based social marketing.

- **Incentives** – The structured use of funding, rewards, and recognition to motivate CII water users to improve water use efficiency. Incentive programs include, but are not limited to: (1) economic incentives, such as rebates and cost-share for replacing inefficient fixtures, equipment, irrigation systems, and landscapes with water efficient ones, or fees or fines for excessive water use, or non-compliance with ordinances and permits; (2) noneconomic incentives, such as certification or branding programs that recognize customers as water efficient; and (3) regulatory and administrative incentives, such as value-added programs that offer additional benefits, including, but not limited to, inspection requirements for a new installation or permitted landscape rehabilitation to verify its compliance with the State's MWELO (or the local Water Efficient Landscape Ordinance), or inspection and certification requirement to confirm that all fixtures and appliances on the property meet the water use efficiency requirements in the California Building Standards Code (CCR, Title 24) before a new service (e.g., water, sewage, or electricity services) can be provided.

- **Landscape** – Landscape irrigation and management practices to promote improved water use efficiency. These practices may include, but are not limited to, turf removal or replacement programs; irrigation system inspection and maintenance; irrigation scheduling training; new development landscape inspection; workshops and training; and other practices to create additional opportunities for consistent implementation and proper landscape maintenance.

- **Operational Practices** – Necessary or planned operational BMP(s) to improve CII water use efficiency, records for implemented CII Water User BMPs and CII Water Supplier BMPs, or areas of collaboration with other local governmental entities or regional organizations. The operational practices may include, but are not limited to, system infrastructure changes (e.g., smart meter replacement programs); billing or data collection procedures (e.g., data tracking, analysis, and reporting improvements); processes or procedures for collaboration and communication (e.g., formal process to coordinate with local land use authority for MWELO reports); and other practices to facilitate CII-BMP program implementation and evaluation.

- **Collaboration and Coordination** – Formalized internal operational and institutional arrangements with other local government agencies, non-profit organizations, and other entities for various reasons, such as making cooperative agreements with other authorities to streamline reporting requirements, data collection, or implementation of BMPs by coordinating with necessary authorities. The collaboration and coordination arrangements may include, but are not limited to, coordination with 'green' building certification or recognition programs to promote water use efficiency; coordination with land use authorities to check new landscape design and implementation; collaboration with non-governmental

organizations on outreach and education; and other activities that could help improve the CII water use efficiency.

- **Other** – Other CII-BMPs, excluding CII Water User BMPs, derived from additional innovation and technology advancement that are not within the above categories of actions that can be taken by urban retail water suppliers.

Process water BMPs and water assessments (also known as water audits), CII Water User WMPs, and other CII Water User BMPs are not required for the CII-BMPs Performance Measure, nor are they required to be within the above categories of actions. However, where feasible, DWR encourages urban retail water suppliers to consider including these actions in the CII Water Use Efficiency Improvement Program to provide a full spectrum of engagement with CII water users and technical assistance.

Requirements for Implementation

DWR recommends that urban retail water suppliers be required to include in their CII Water Use Efficiency Improvement Program a component (or program) for CII Water Supplier BMPs implementation (hereinafter referred to as “CII-BMP implementation program”), which satisfies the requirements outlined below to improve CII water use efficiency within their service areas. Urban retail water suppliers should advocate for the implementation of CII Water User BMPs to all CII water users to complement their own CII-BMP implementation programs.

- The CII-BMP implementation programs should consist of the following, at a minimum:
  - One CII Water Supplier BMP from each of the first five categories of actions described above (excluding the category “others”).
  - Identification of targeted CII water users and associated sectors (classifications) based on the thresholds described above and associated CII Water Supplier BMPs categories and implementation actions.
  - One CII Water Supplier BMP from the outreach, technical assistance, and education category and one CII Water Supplier BMP from the incentives category for each identified CII water use sector (or classification) with needed customization, if warranted.
- Urban retail water suppliers are required to provide supporting information to document their selection of CII Water Supplier BMPs for implementation and the pairings between the CII water use sector (or CII water use classification) with selected CII Water Supplier BMPs.

- Urban retail water suppliers may combine attributes of several categories of actions mentioned previously in the design of their CII-BMP actions or programs. Where applicable, urban retail water suppliers should provide sufficient supporting information to document the satisfaction of the requirements for a CII-BMP implementation program.

- Urban retail water suppliers shall include the following additional CII Water Supplier BMPs in their CII-BMP implementation programs:

  - Update CII water use classification and review applicable CII-BMPs for modified or new water service requests.

  - Require CII water users to provide documentation of implementation of applicable requirements for efficient fixtures and equipment in the California Building Standards Code (CCR, Title 24) prior to initiation of new water service.

  - Coordinate with applicable land use authority(ies) to add a requirement for consulting with or informing urban retail water suppliers, where appropriate, during the permitting process for facility improvements or changes that may pertain to opportunities in CII water use efficiency improvement.

- As part of its CII-BMP implementation program in the urban retail water supplier's CII Water Use Efficiency Improvement Program, an urban retail water supplier is required to define the following:

  - An implementation schedule consistent with the schedule requirements described in Section 4.3.

  - Key performance indicators and annual goals, subdivided by category of actions and/or CII sectors (or CII water use classification), for effective review of program implementation and successes according to the identified schedule.

  - Strategy for coordinated implementation with other CII water use performance measures (i.e., CII Classification System PM, Conversion Threshold PM, and In-Lieu Technologies PM) and CII-DIMWUS.

  - Financing strategy (e.g., internal budget allocation and grant funding) to support timely CII-BMP implementation.

  - Documentation and procedures to record and track CII-BMP implementation to meet performance measures described in Section 4.3, and to support annual reporting requirements described in Section 4.4.

  - Processes, procedures, and triggers for updates to the CII-BMP implementation program to address changed conditions, including, but not limited to, outcomes of implementation, regulatory changes, technology advancement, and lessons learned from implementation.

- For reporting purposes, urban retail water suppliers are not required to develop any key performance indicators based on volumetric information on CII water use as part of the CII-BMP implementation program; however, they can be used per the preferences and prerogatives of urban retail water suppliers.

- Urban retail water suppliers may participate in a regional CII-BMP implementation program to satisfy part of the above requirements.

  - Because generalization and uniformity are generally not expected among CII water users in service areas of different urban retail water suppliers, urban retail water suppliers shall ensure development of their own, locally specific CII-BMP implementation program in combination with the regional program incorporated by reference. The locally specific CII-BMP implementation program will provide the additional necessary components and key performance indicators to completely cover the CII-BMPs Performance Measure requirements and address the individual, unique conditions.

  - Regional key performance indicators are not substitutes for key performance indicators required for individual urban retail water suppliers to properly evaluate the progress of their CII-BMP implementation program, although some may be applicable, and the regional agency may be able to provide to the individual urban retail water supplier their service area–specific participation and success metrics.

Thresholds for Actions

DWR recommends one standard set of thresholds required for all urban retail water suppliers, or an alternative threshold required for urban retail water suppliers that have more experience in implementing CII-BMPs and have reached the standard thresholds.

Standard Thresholds for All Urban Retail Water Suppliers

DWR recommends that urban retail water suppliers should, at a minimum, design their CII-BMP implementation program targeting CII water users to satisfy both of the two following conditions:

- 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.

- Excluding process water, CII water users within the CII water use classifications, based on the CII Classification System PM, which covers the top 20 percent of CII water users.

When determining targeted CII water users using the above thresholds, either of the following two approaches may be used to exclude process water use from the CII-BMPs Performance Measure:

- Exclude CII water users whose process water use comprises 80 percent or more of their total water use from the identified list of targeted CII water users.

- Use the adjusted total water use for each individual CII water user by subtracting estimated process water use volume.

In both approaches, it is not required that process water use be exactly quantified for each CII water user, recognizing that this can be proprietary information and may fluctuate based on production rates. Estimates can be based on reports, surveys, research, type of facility or type of CII water user, and consultation with individual CII water users. Urban retail water suppliers should document their approach and supporting information for determination of process water use.

The above standard thresholds are used to set the minimum level of required implementation. Urban retail water suppliers are not restricted from expanding the targeted CII water users for water use efficiency improvement.

Alternative Threshold for Experienced Urban Retail Water Suppliers

DWR recommends that an enhanced threshold may be used for urban retail water suppliers that have completed the assessments of water use by CII water users meeting both of the above standard thresholds and deemed their water uses efficient or limited in potential water use efficiency improvement from additional CII-BMP implementation. Under this condition, urban retail water suppliers will, at a minimum, continue implementing their CII-BMP implementation program as the following:

- Target CII water users to cover, at a minimum, 25 percent of all CII water users in their corresponding service area using a method chosen by the urban retail water user to maximize the opportunity for additional CII water use efficiency improvement on the urban retail water supplier level.

- Provide sufficient documentation for the determination of meeting the requirements under the standard set of thresholds.

- Continue monitoring and exploring new opportunities for engaging CII water users identified by the standard set of thresholds for additional water use efficiency (e.g., changes of CII water use classification due to changes in

business at a location, improved technology, or implementation of improvements for separating process water from other uses).

State Agencies' Supportive Actions

Subject to additional necessary approvals, DWR may coordinate with the State Water Board and other agencies to issue an advisory to land use authorities for cooperation with and assistance to urban retail water suppliers in information-sharing during building and permit issuances that may affect CII water use.

4.3 Performance Measure

DWR recommends that urban retail water suppliers coordinate implementation of their respective CII-BMP implementation programs with their implementation of the CII Classification System PM, because the thresholds recommended in Section 4.2 are tied to CII water use classifications and, thus, are subject to the progress and schedule of implementing the CII Classification System PM.

DWR's recommended CII Classification System PM has an initial implementation period of up to five years after the State Water Board adopts the performance measure, with an anticipated minimum of 20 percent of CII water users classified per year. If an urban retail water supplier does not meet the annual 20 percent mapping requirement, the urban retail water supplier shall include in its annual reporting an explanation and its plan to meet the full mapping requirement by the fifth year after adoption (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 shall provide an implementation plan with a revised schedule to meet the full mapping requirement. That implementation plan will be subject to the State Water Board's approval. The coordinated implementation means that, where possible, the CII water use classification efforts should start with water users of high total water use volume (including the volume of process water use, where applicable). Refer to *Recommendations for Commercial, Industrial, and Institutional Water Use Classification System Performance Measure* (WUES-DWR-2021-17) for additional details.

DWR recommends that the urban retail water supplier's CII-BMP implementation program satisfy the following milestones:

- Urban retail water suppliers shall implement initial education and outreach to CII water users on the new regulatory requirements, including CII water use performance measures, immediately after the State Water Board's adoption of urban water use efficiency standards, variances, and performance measures per the 2018 Legislation (hereinafter referred to as the "State Water Board's adoption").

  - The initial education and outreach will build on the urban retail water suppliers' past CII water use efficiency practices, with a focus on sharing the information regarding upcoming coordinated implementation of the CII water use performance measures.

  - Based on experience and to the extent feasible, begin sector-specific initial education and outreach targeting the CII water users that may fit the standard thresholds specified in Section 4.2 for CII-BMP implementation.

- Urban retail water suppliers shall complete the identification of the targeted CII water users based on the standard thresholds specified in Section 4.2 within one year after the State Water Board's adoption (Year 1).

- Urban retail water suppliers shall design their CII-BMP implementation program within two years after the State Water Board's adoption and complete design no later than the end of Year 2.

  - Urban retail water suppliers shall begin the full implementation of their CII-BMP implementation program satisfying the specifications in Section 4.2 in the year immediately following the classification of targeted CII water users, and no later than the beginning of Year 3.

  - Up to one additional year (i.e., a total of two years) is allowed to develop the CII-BMP implementation program for urban retail water suppliers, whose top 20 percent of CII water users by total water use volume have substantial process water use components. This additional year is provided in order to ensure sufficient and appropriate non-process water CII water users are classified for reference in the CII-BMP implementation program, of which the full implementation should begin no later than the beginning of Year 3.

  - Should the schedule for implementing the CII Classification System PM be delayed due to hardship, urban retail water suppliers shall complete the identification of targeted CII water users to allow the subsequent full implementation of their CII-BMP implementation program in the year following when 60 percent of CII water users are classified, according to the revised schedule for implementing the CII Classification System PM approved by the State Water Board.

  - Urban retail water suppliers shall conduct all CII implementation program actions for targeted CII water users meeting the standard thresholds in Section 4.2 within five years (end of Year 5) after the State Water Board's adoption.

  - Urban retail water suppliers that complete their actions for targeted CII water users meeting the standard thresholds in Section 4.2 should identify and take actions for CII water users meeting the alternative thresholds in Section 4.2.

- Urban retail water suppliers shall update their CII-BMP implementation program, including the reexamination of targeted CII water users meeting the thresholds described in Section 4.2, periodically and, at a minimum, every five years. Urban retail water suppliers are required to continue implementing the CII-BMP implementation program, as updated, without delay.

- Urban retail water suppliers shall report their progress on CII Water Supplier BMPs implementation per their CII-BMP implementation program and its identified key performance indicators meeting the specifications in Section 4.2 as part of their Annual Water Use Report submitted after the State Water Board's adoption and prepared per the annual reporting requirements in Section 4.4.

4.4 Annual Reporting Requirements

DWR recommends that urban retail water suppliers shall report their progress on CII-BMP implementation per their CII-BMP implementation program meeting the specifications in Section 4.2 as part of their Annual Water Use Report submitted after the State Water Board's adoption. DWR further recommends that the annual progress report shall meet the following requirements:

- Urban retail water suppliers shall report their UWUO, actual water use, and progress in implementing CII water use performance measures, including the CII-BMPs Performance Measure, in their Annual Water Use Reports due by January 1 of each year starting in 2024.

- Urban retail water suppliers shall, in their first Annual Water Use Report, declare their intention for reporting their annual water use and progress implementing CII water use performance measures, including the CII-BMPs Performance Measure, on either a calendar year (January through December) or fiscal year (July through June) basis, and consistently report accordingly thereafter.

  - Urban retail water suppliers shall submit their first Annual Water Use Report to DWR no later than January 1, 2024, and by January 1 every year thereafter, to be consistent with WC Section 10609.24(a), but not before the State Water Board's adoption of the relevant standards, variances, guidelines and methodologies, CII performance measures, and Annual Water Use Report requirements.

  - The reporting period is for the previous complete year. For their first Annual Water Use Report, urban retail water suppliers shall report data, information, and activities from:

    - January 1, 2022, through December 31, 2022, for calendar year-based reporting.
    - July 1, 2022, through June 30, 2023, for fiscal year-based reporting.

- Urban retail water suppliers shall report on their progress in implementing their CII-BMP implementation program, which satisfies the requirements in Sections 4.2 and 4.3, according to the identified key performance indicators and program components.

  - When documenting actions for the first Annual Water Use Report prior to the State Water Board's adoption, DWR recommends that urban retail water suppliers report on the existing implementation of CII-BMPs and may include additional information to give context for their historical implementation of CII-BMPs and associated regulatory settings.

  - When documenting actions for the Year 1 Annual Water Use Report following the State Water Board's adoption and before the urban retail water suppliers have identified the CII water users required to be in the CII-BMP implementation program, DWR recommends that urban retail water suppliers report on the existing implementation of CII-BMPs and the outcomes of early education and outreach CII-BMPs to inform CII water users of the CII-BMP implementation program development.

  - Urban retail water suppliers are not required to report quantity of water savings from CII-BMP implementation unless the urban retail water suppliers voluntarily include volumetric key performance indicators in their respective CII-BMP implementation programs, as described in Section 4.2.

  - Urban retail water suppliers participating in a regional CII-BMP implementation program to partially satisfy the specifications in Section 4.2 and the performance measure in Section 4.3 must, in their own Annual Water Use Report, individually report relevant information pertinent to their CII-BMP implementation program and key performance indicators identified by individual urban retail water suppliers.

DWR also recommends the following reporting requirements:

- Reporting on the implementation of performance measures cannot occur until they have been adopted by the State Water Board.

- The performance measure annual reporting requirements are specific to each urban retail water supplier's annual milestones, which are at the end of each implementation year and not on specific Annual Water Use Reports.
    - There will be differences in reporting between urban retail water suppliers implementing the performance measure on a calendar year or fiscal year basis.

DWR's recommended reporting requirements are summarized in Table 4-1, below.

Table 4-1 California Department of Water Resources' Recommended Commercial, Industrial, and Institutional Best Management Practices Performance Measure Reporting Requirements

Reporting Schedule	Reporting Requirement	Minimum Expected Progress	Reporting Value
End of Year 1 after adoption as part of the Annual Water Use Report due in the following January.	• Description of performing education and outreach to CII water users regarding coordinated implementation of CII performance measures. • Identification of targeted CII classifications and individual CII water users based on recommended standard thresholds* for CII-BMP implementation program for all urban retail water suppliers that do not have hardship in classifying CII accounts (refer to the CII Classification System PM). • Completed design of the CII-BMP implementation with metrics and/or key performance indicators after the State Water Board's adoption if there are no process water users in the recommended thresholds. * Standard Thresholds (see Section 4.2 for details) • 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. • Excluding process water, CII water users within the CII water use classifications, based on the CII Classification System PM, which covers the top 20 percent of CII water users.	• Begin sector-specific initial education and outreach to CII water users that may fit the standard thresholds identified. – Experienced urban retail water suppliers may follow alternative thresholds set to continue implementing their CII-BMP implementation program (See Section 4.2 for details). • Starting with the related CII Classification System PM, classify 20 percent of all CII water users by end of Year 1. – DWR recommends that the classification of the first 20 percent of all CII water users include the top 20 percent of CII water users by volume. – Note that for streamlined implementation, urban retail water suppliers should use the CII water users classified per the CII Classification System PM in Year 1 to identify targeted CII water users for the CII-BMP implementation program in the following year.	• Describe initial education and outreach program for CII water users that may fit the thresholds identified per the 2018 Legislation requirements, including program strategy and outcomes. • Update the assessment from first Annual Water Use Report and begin the design of the CII-BMP implementation program and document improved water use efficiency via CII-BMP implementation program key performance indicators, if it is complete. • Excluding process water, identify the top 20 percent of CII water users within the CII water use classifications and top 2.5 percent of CII water users in the service area (standard thresholds). – Identify if additional classification of CII water users is needed to identify the top 20 percent of CII sectors and top 2.5 percent of individual non-process water CII water users.
End of Year 2 after adoption as part of the Annual Water Use Report due in the following January.	• Identification of targeted CII classifications and individual CII water users based on recommended thresholds for CII-BMP implementation program for all urban retail water suppliers that do not have hardship in classifying CII accounts (refer to the CII Classification System PM). • Completed design of the CII-BMP implementation program for urban retail water suppliers that required an additional 20 percent classification.	• Complete design of the CII-BMP implementation program no later than end of Year 2. – One additional year (a total of two years) is allowed for urban retail water suppliers whose top 20 percent of CII water users by total water use volume have substantial process water components. • In the related CII Classification System PM, classify second top 20 percent of CII water users (40 percent of all CII water users classified) to identify the next 20 percent of water users for CII-BMP implementation program. – DWR recommends that classification of the next 20 percent of all CII water users include the next highest 20 percent CII water users by volume (40 percent of all CII water users are classified by end of Year 2). • Implement CII-BMP program for the top 20 percent CII water users identified in Year 1 based on the related CII Classification System PM for each of the two identified thresholds.	• Report if CII-BMP implementation program is complete and, if applicable, document improved water use efficiency via CII-BMP implementation program key performance indicators. • Excluding process water, identify the next top 20 percent of CII water user based on CII Classification System PM and top 2.5 percent of CII water users in the service area. • Implement CII-BMP implementation program for the top 20 percent CII water users identified in Year 1 for each of the two identified thresholds. – If 20 percent more CII water users need to be classified to meet the top 20 percent or 2.5 percent of non-process water CII water users, document progress towards completing CII-BMP implementation program.

Reporting Schedule	Reporting Requirement	Minimum Expected Progress	Reporting Value
End of Year 3 after adoption as part of the Annual Water Use Report due in the following January.	• Identification of targeted classifications and individual CII water users for all urban retail water suppliers that do not have hardship in classifying CII accounts (refer to the CII Classification System PM). • Full implementation of the CII-BMP program. • Completed design of the CII-BMP implementation program for urban retail water suppliers with substantial process water components including metrics or key performance indicators.	• Complete CII-BMP implementation program for all urban retail water suppliers that do not have hardship in classifying CII accounts per the CII Classification System PM). – If there is hardship with CII classification, provide revised schedule for approval by the State Water Board. • If CII-BMP implementation program was completed in Year 2 after adoption, implement CII-BMP program in accordance with program schedule. – In the related CII Classification System PM, classify next 20 percent of CII water users (60 percent of all CII water users classified) to identify the next 20 percent of water users for CII-BMP implementation program. • Implement CII-BMP program for the second top 20 percent CII water users identified in Year 2 based on the related CII Classification System PM for each of the two identified thresholds.	• Education and outreach programs implemented. • If CII-BMP implementation program was completed in Year 2 after adoption, document improved water use efficiency via CII-BMP implementation program key performance indicators.
End of Year 4 after adoption as part of the Annual Water Use Report due in the following January.	• Progress towards employing CII-BMP implementation program.	• In the related CII Classification System PM, classify next 20 percent of CII water users (80 percent of all CII water users classified) to identify the fourth top 20 percent of water users for CII-BMP implementation program. • Employ CII-BMP implementation program in accordance with program schedule (i.e., implement CII-BMP program for the third top 20 percent CII water users identified in Year 3 based on the related CII Classification System PM).	• Progress report on CII-BMP implementation based on program schedule. • Document improved water use efficiency via CII-BMP implementation program identified key performance indicators.
End of Year 5 after adoption as part of the Annual Water Use Report due in the following January.	• Progress towards employing CII-BMP implementation program.	• In the related CII Classification System PM, classify the final 20 percent of CII water users (100 percent of all CII water users classified) to identify the last 20 percent of water users for CII-BMP implementation program. • Employ CII-BMP implementation program in accordance with program schedule (i.e., implement CII-BMP program for the fourth top 20 percent CII water users identified in Year 4 based on the related CII Classification System PM).	• Progress report on CII-BMP implementation based on program schedule. • Document improved water use efficiency via CII-BMP implementation program key performance indicators.
End of Year 6 after adoption as part of the Annual Water Use Report due in the following January.	• Revisited targeted CII sectors and individual CII water users and revise CII-BMP implementation program as needed. • Progress towards employing CII-BMP implementation program.	• Employ CII-BMP implementation program in accordance with program schedule (i.e., implement CII-BMP program the last 20 percent CII water users identified in Year 5 based on the related CII Classification System PM). • Revise CII-BMP implementation program, if applicable, for all CII water users.	• Progress report on CII-BMP implementation based on program schedule. • Document revisions or updates to CII-BMP program, if applicable. • Document improved water use efficiency via CII-BMP implementation program key performance indicators.

Key:
CII = commercial, industrial, and institutional
CII-BMP = commercial, industrial, and institutional water use best management practice

4.5 Challenges and Considerations

Stakeholders provided significant input on many potential challenges and obstacles they anticipated in implementing the CII-BMPs Performance Measure and related requirements for improving urban water use efficiency. This section provides general descriptions of challenges that cannot be addressed completely within DWR's recommendations and serves as additional contextual considerations for the pending regulatory process.

Implementation Considerations for Commercial, Industrial, and Institutional Best Management Practices Performance Measure

Major challenges stakeholders raised during the development process for the CII-BMPs Performance Measure include the limitations of authority, financial and organizational capacities, incentives for implementation, and effectiveness of certain CII-BMPs. These challenges were also identified or echoed by DWR's literature research and investigations, as addressed the technical report, *Best Management Practices for Commercial, Industrial, and Institutional Water Use* (WUES-DWR-2021-16.T1).

Significant discussions are documented in Sections 2 and 3 of this report. DWR has incorporated these stated challenges in the above recommendations through flexible requirements and streamlined schedule and requirements with other CII water use performance measures to reduce burdens on urban retail water suppliers and provide recommendations that are adequate for implementation by urban retail water suppliers. However, certain challenges for implementing the CII-BMPs Performance Measure may persist, as discussed below.

- **Financial Feasibility and Economic Productivity**: DWR's recommended CII-BMPs Performance Measure to improve water use efficiency in the CII sectors recognizes that the diversity among locations, sectors, and CII water users within sectors does not lend itself to quantified standards or metrics for CII water use efficiency. This challenge, when coupled with other factors detailed in Section 3, made a direct assessment on financial feasibility and effects on economic productivity difficult.

- **Affordability**: The insufficient organization capacity of an urban retail water supplier to accommodate the new requirements under 2018 Legislation, including those of the CII-BMPs Performance Measure, would eventually translate into the cost of services for residents and CII water users in its service area. The level of affordability depends on many factors as described in Section 3 and, thus, general assessments for affordability are likely not helpful. Affordability for CII water users would further tie to business competitiveness and market advantages.

DWR formulated the recommendations with the intent to avoid or minimize the potential undue financial burdens to urban retail water suppliers and to CII water users. While these considerations are important for implementation, it is likely that direct application or analyses may have to wait and depend on the results of data collection after several years of implementation of the CII Classification System PM. Before then, it may remain an unclear or confusing subject and, potentially, a debatable point for implementing CII-BMPs, contributing to the needs of technical and financial assistance that are commonly expressed by urban retail water suppliers and stakeholders.

Other General Implementation Considerations for Improving Urban Water Use Efficiency

Several suggestions and general recommendations were proposed by stakeholders in the various working groups and public meetings. These suggestions and general recommendations recognize that successful implementation of the new water use efficiency standards and UWUOs requires complementary actions by the State to assist urban retail water suppliers as they implement the new framework. DWR heard repeatedly from stakeholders that technical and financial support for urban retail water suppliers are key for the successful implementation of the new framework.

DWR includes these suggestions and general recommendations to underscore their importance for future consideration because improving urban water use efficiency depends on the successful implementation of the final water use efficiency standards adopted by the State Water Board. These ideas are not specific recommendations from DWR to the State Water Board; however, DWR may consider these suggestions raised by stakeholders when new standards are approved by the State Water Board. DWR recognizes that it will require time, effort, and funding to implement these suggestions; and the pace of implementation will depend upon the feasibility and availability of resources and competing priorities.

Stakeholder suggestions specific to the CII-BMPs Performance Measure included the following:

- **Data Streamlining**. Required tracking and reporting will require additional resources. Reporting should be streamlined, with DWR working with stakeholders to identify useful data points to collect and eliminate unnecessary reporting.
  - DWR recommends that the State Water Board address the need for centralization and consolidation of data inquires with high quality templates, guidance documents, and State-sponsored implementation support.
  - Performance measure compliance reporting to the State should use a checkbox system or form to indicate which activities from each of the five BMP categories the agency is implementing. Additionally, there should be an

option to report on whether or not the measure is being implemented on a regional basis.

General stakeholder suggestions and recommendations included the following:

- **Technical Assistance**
  - The State should consider providing technical assistance to urban retail water suppliers, in particular, smaller urban retail water suppliers with limited resources for implementation and reporting of UWUOs, variances, actual water use, and other progress reports to DWR.
  - The State should consider providing technical assistance and guidance to urban retail water suppliers on measuring landscapes associated with CII-DIMs (or equivalent technologies).
  - The State should consider providing technical assistance to urban retail water suppliers on how customers can improve outdoor water use efficiency while protecting existing landscapes. This includes landscapes with higher plant factors, urban wildlife habitat, and urban shade trees.
- **Financial and Local Assistance**
  - The State should consider providing direct financial assistance programs, not rebates, for low-income communities to assist with mitigating potential water affordability and to support the human right to water.
  - The State should consider providing financial assistance to urban retail water suppliers, wastewater, and recycled water utilities to mitigate the financial impacts of new UWUOs and support the implementation of water use efficiency programs.
  - The State should consider offering incentives to urban retail water suppliers to support customer water use efficiency via local assistance grants and loan programs.
- **Outreach and Messaging**
  - The State should augment efforts by the Save Our Water campaign to assist customers in understanding the need for water and wastewater rate changes.
  - The State should support additional statewide messaging to incentivize customers to participate in water use efficiency programs and upgrades.

- **Data**
  - Stakeholders recommended that DWR provide aerial CII landscape area measurements and assistance for mapping a CII-DIM (or equivalent technology) locations and ground-truthing associated irrigated areas.
  - The State should consider providing urban retail water suppliers updated landscape area measurement data every five years.
- **Other**
  - Stakeholders have recommended that the water use efficiency standards and performance measures allow more time for urban retail water suppliers to perform outreach and coordination with their CII water users.
  - The State should encourage local jurisdictions responsible for MWELO to improve MWELO implementation and enforcements.

5.0 Glossary

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

best management practice. A set of practices, measures, or procedures that are beneficial, empirically proven, cost effective, and widely accepted by the professional community.

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, industrial, and institutional water use best management practice implementation program. A component (or program) of the Commercial, Industrial, and Institutional Water Use Efficiency Program that requires urban retail water suppliers to include an implementation program for commercial, industrial, and institutional water use best management practices.

commercial, industrial, and institutional water user water management plan. A water management plan developed by or for a commercial, industrial, and institutional water user to identify water uses and opportunities for improvement in water use efficiency and define an implementation and finance strategy.

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.

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).

In-Lieu Technologies. Technologies that improve landscape water use efficiency by any means other than the direct measurement of water use that is an equivalent technology. In-Lieu Technologies refers to the devices, equipment, or analytical methods that are defined in the California Department of Water Resources' recommended In-Lieu Technologies Performance Measure.

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).

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).

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

payback period. The amount of time before the cost savings exceed the initial upfront cost to install the device or to reach the break-even point.

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).

process water. As defined in California Water Code Section 10608.12(p), this is water used by industrial water users for producing a product or product content or water used for research and development. Process water includes, but is not limited to, continuous manufacturing processes, and water used for testing, cleaning, and maintaining equipment. Water used to cool machinery or buildings used in the manufacturing process or necessary to maintain product quality or chemical characteristics for product manufacturing or control rooms, data centers, laboratories, clean rooms, and other industrial facility units that are integral to the manufacturing or research and development process is process water. Water used in the manufacturing process that is necessary for complying with local, State, and federal health and safety laws, and is not incidental water, is process water. Process water does not mean incidental water uses.

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).

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, institutional, and industrial 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).

water assessment. A comprehensive analysis of the current water use of a facility, and subsequent development of a strategy to increase water use efficiency.

water audit. See water assessment.

water management plan. A plan that identifies water uses and opportunities for improvement in water use efficiency. An implementation plan and associated financial strategies are often included.

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

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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-2021-17.

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