Workshop Materials

Water Use Studies and Standards, Methods, and Performance Measures Working Group, May 24, 2021 Workshop

Enclosed in this packet:

1. Meeting notification email
2. Meeting Agenda
3. CII BMPs White Paper Outline (Preliminary Draft)
4. List and description of CII BMPs

Additional Materials for Reference:

This meeting will build on previous presentations/meetings. Copies of slide presentations and recordings of previous meetings can be found at:

https://cawater.sharepoint.com/sites/dwr-wusw/SitePages/Water-Use-Studies.aspx

Dear Stakeholder,

Thank you for your ongoing participation and engagement in the meeting series to inform the development of the Commercial, Industrial and Institutional (CII) outdoor landscape area with dedicated irrigation meters standard, classification, and performance measures that will become part of DWR's urban water use objectives standards, methodologies, and performance measures recommendations to the State Water Resources Control Board (SWRCB) by October 1, 2021.

During the first two meetings, DWR staff and the consultant team presented approaches and initial research findings to inform the process. The two scheduled meetings in May and June will have a different format. DWR is scheduling working sessions with workgroup members after which stakeholders will be invited to learn about the workgroup's discussions and provide additional feedback.

The stakeholder meetings will remain on the currently scheduled date but will be shortened and will focus on workgroup and stakeholder input.

The stakeholder meeting on Monday, May 24th is being rescheduled to 11AM-12PM. Please update your calendar with this new time.

The meeting will focus on BMPs and include a review of information identified during the workgroup workshop and allow time for additional stakeholder input. Please see attached the following document for your reference:

- Meeting agenda
- MWM white paper outline
- MWM white paper list of BMPs

Registration for the meeting is required. Please use the provided link below to register for the monthly meeting series:
https://csus.zoom.us/webinar/register/WN_bJmM4yKCTi6iLHQ4s7-eOQ

Thank you for your support and commitment to this effort.

Sabrina Cook
Water Use Efficiency Implementation Section Chief
Department of Water Resources

Department of Water Resources

CII Outdoor Landscape Area with Dedicated Irrigation Meters Standard, classification, and performance measures

STAKEHOLDER MEETING

Monday, May 24, 2021, 11AM-12PM

Zoom Webinar Info: Registration Required

Zoom Registration: https://csus.zoom.us/webinar/register/WN_bJmM4yKCTi6iLHQ4s7-eOQ

Meeting Objectives: Engage workgroup members to gain their input on appropriate best management practices to be incorporated into the CII standards development process

STAKEHOLDER MEETING AGENDA

11:00 **Meeting Logistics and Welcoming Remarks**
Orit Kalman, Senior Facilitator, CSUS-CCP
Sabrina Cook, Water Use Efficiency Implementation Section Chief,
Water Use Efficiency Branch – DWR

11:05 **Overview - the Outline for the Summary of Technical Best Management Practices for Commercial, Industrial and Institutional Water Use**
Lisa Maddaus, CFO/Partner, Maddaus Water Management, Inc.

11:15 **Workgroup Workshop Report Out**
Orit Kalman/Workgroup members

Key question: What are the conditions that will make specific BMPs beneficial/effective?

a. What **opportunities/positive outcomes** does the BMP present?
b. What are the **challenges** for implementation?
c. What **alternative strategies and innovation** can either overcome identified challenges or can result in similar outcomes?
d. What **information/data** is needed to establish BMP's effectiveness in achieving positive outcomes?

11:40 **Additional input from Stakeholders**

12:00 **Adjourn** [Optional – continued discussion until 12:30]

MADDAUS WATER MANAGEMENT INC.

Technical Memorandum – DRAFT

Date: May 17, 2021

To: Sabrina Cook, California Department of Water Resources

From: Lisa Maddaus, Maddaus Water Management Inc.

Title: **Preliminary Draft Annotated Outline and Literature Review: Summary of Technical Best Management Practices for Commercial, Industrial, and Institutional Water Use**

1. INTRODUCTION

This memorandum presents both an initial outline and a preliminary literature review for a technical white paper aimed at addressing the "Making Water Conservation a California Way of Life" mandate.[1] The state law requirement is for the California Department of Water Resources (DWR) to provide technical recommendations for feasible Commercial, Industrial, and Institutional (CII) performance measures that include best management practices (BMPs), such as conducting audits and preparing CII customers' water management plans.

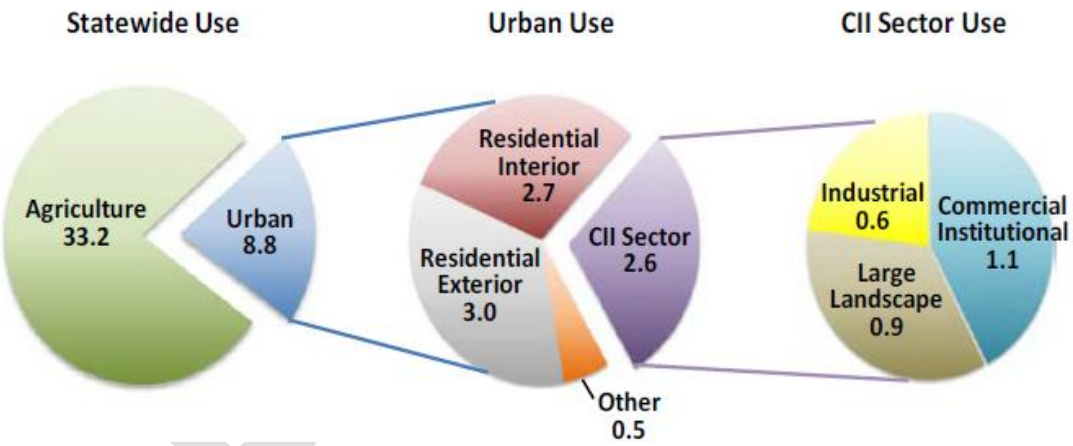
This draft outline is provided for DWR staff review and comment focused only on the CII BMPs related to performance measures that are customer-related. It is assumed that the draft outline will be refined, and preliminary literature review will be expanded upon based on DWR staff and stakeholder feedback. In an effort to garner feedback, two presentations have been provided at DWR Workgroup Meetings on March 22 and April 26, 2021. In addition, a CII BMP survey has been posted to seek input on a robust list of BMPs. The survey is organized into three groups of measure types: (1) education; (2) incentives; and (3) policies. It is intended that this BMP list be further vetted through workgroup and stakeholder meeting discussions. The intent for the finalized version of the BMP list is to be an attachment to the technical white paper, serving as a menu of options for suppliers to implement based on unique CII water use and conservation potential in their service areas. Additional input is being sought in a workshop scheduled for May 24, 2021, with breakout sessions along with a follow-up open discussion with stakeholders to explore opportunities and barriers to implementing CII BMPs.

2. DRAFT OUTLINE FOR TECHNICAL PAPER

1. Purpose
    a. Legal requirement to prepare recommendations.
    b. Reference to state law and DWR/State Board Primer.
2. Introduction
    a. Roles and Responsibilities: Define roles and responsibilities of DWR, Water Providers, State Board.
    b. Stakeholders, who and how participated

[1] For more information on Assembly Bill 1668 and SB 606, reference prepared by the DWR and State Water Resources Control Board: *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),*

3. Definitions: Alphabetical, Both Technical and Legal Definitions
4. Overview for CII Water Efficiency in New Growth Mindset
    a. The CII sector is fundamental to California's $2.72 trillion dollar (2020) economy and structure. It employs residents, provides goods and services, and maintains the state's position as a center for technology and innovation. Though California's economy has grown, the water used in the state has remained generally consistent. Increasing water use efficiency is critical to growing and protecting the state's economy and to reducing pressures on California's water resources and environmental health (DWR Vol 1, 2014).
    b. Changing CII customers needs, growing population, drought, climate change, and the need to protect and grow California's economy, while protecting and restoring our fish and wildlife habitats, make it essential that the state manage its water resources as efficiently as possible (DWR Vol 1, 2014).
    c. Addressing water efficiency in CII water sector can be challenging due to the diversity of water uses, sophistication of equipment, and number of fixtures. As discussed in the CII Task Force Report, there is no "one-size-fits-all" approach to CII water efficiency.
5. Background on CII Customer Water Uses
    a. Water customers can be divided into residential and non-residential sales but are commonly further classified into customer categories. For non-residential sales, the customer categories typically fall into some combination of commercial, industrial, and institutional sectors.
    b. Within the CII water users, there are more specific categories, such as restaurant, motels and hotels, schools, office buildings, etc. However, there currently does not exist a standardized CII classification across water utilities and cities, so it is not possible to specify water users in unique CII subcategories.
6. Profile of CA CII Water Use
    a. Provide DWR estimates that the CII sector. Historical documentation presents that CII water use accounts for approximately 30%, or roughly 2.6 million acre-feet (MAF), of total urban water use in California.



Volumetric breakdown of California Non-Environmental Developed Water Use
Note: Based on 1998-2005 CWP averages. Volumes shown are in millions of acre-feet per year.
Source: (DWR Vol 1, 2014)

    b. Top users
        i. Understanding the distribution of demand can also be helpful in water conservation planning, as it can answer the question of just how much of the water demand comes from top users. The larger the portion of water consumption that comes from top users, the easier water conservation becomes by targeting these top users. (Boston University, 2019).
        ii. Previous research has shown that as much as 80 percent of CII water use is consumed by 20 percent of CII users (Dziegielewski et al., 2000).

7. Sector Complexity
    a. Water customers in the CII sector produce a multitude of goods and services, which makes it difficult to evaluate water demand among these users (Kiefer et al., 2015). Even when CII Customers are the same sector with almost same characteristics, there can be vastly different water use patterns. For example, some restaurants are high volume, and some are small, boutique or not as busy. This presents significant barriers for benchmarking metrics in the CII sector. In addition, process water is not included in AB 1668 directly related to any BMPs as a proprietary information and data is a constraint. Also achieving water use efficiency on complex sites using process water is normally identified and addressed on a case by case basis where cost effective and deemed technically feasible.
8. Types of Sector Water Use
    a. Specify different types of customers in sector.
    b. There are a wide range of CII customer types.
    c. Despite the diversity of CII customers, many have similar end uses for water (EPA, 2009, Table 2) with varying percentages across indoor/domestic use, outdoor water use, and cooling and heating (HVAC) uses.
9. Basis for Water Efficiency BMP related Performance Measures
    a. A wide range of Best Management Practices (BMPs) have been developed that focus on technical advancements and improved management practices that will increase the efficiency of water use in the CII sectors.
    b. Define comprehensive list of potential measures **(Future appendix, see draft BMP List as an attachment in May 24th Workshop Packet.**
        i. Reference findings from DWR CII Stakeholder Survey – option to add information as an appendix
    c. Provide summary of case study examples.
10. Background on Audits/Surveys and Water Management Plans
    a. The goal of an Audit/Survey is to identify any wasteful practices and gather information for a Water Management Plan (WMP).
    b. The goal of a WMP is to provide a framework for CII facilities to monitor, measure, and report water efficiency progress on a defined interval.
    c. An effective WMP would serve to document water use data, identify opportunities for improved water efficiency, and define a strategy for implementation.
    d. A Model Water Management Plan Template that included standard elements could ensure consistent reporting across water providers, to the extent possible. Understanding the business sector want brevity. Seeking WMP examples.
    e. An effective Audit/Survey Program would define standards for WMPs.
    f. An effective WMP Program also may include an independent verification, either by a 3rd party or independent internal verification process.
11. Technical Opportunities and Considerations - Alternative Strategies
    a. All suppliers subject to AB 1668 and SB 606 are envisioned to have some form of a CII WUE Program.
    b. Goal is for a flexible approach by perhaps different thresholds on size of agency and also flexibility leveraging a list of approved BMPs be made available that are appropriate to the service area CII customer base. It is assumed basic reporting on activity level would occur when other reporting documentation is collected.
    c. Note: DWR does have to come up suggestions on if and how thresholds are appropriate for when BMPs audits and WMPs are required per CWC §10609.10(b).
    d. Key BMP approaches that are most valuable for CII Water Efficiency. Scenarios? Pros and Cons?
        i. Size/Volume/Number of Accounts - considerations for approaches

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1. Activities-based BMPs (as defined in Water Code) –usefulness for achieving water use efficiency
    a. Education
        i. Audits/Surveys
        ii. WMPs
    b. Incentives
    c. Policies
2. Suite of BMP's based approach – example/information needed to make it work – need to know which work and which do not, may be variable by supplier local characteristics,
    a. ones generally agreed on
    b. ones specific to certain sizes or locations of Suppliers
    c. combination of different types that are most effective (e.g., pick 2 from list A, 2 from list B, and 2 from list C).

ii. Consider if Water providers tracking annual water use volume of their CII sectors would be useful and feasible for their own water efficiency management (based on DWR defined CII classification system) and information or resources needed to make it useful and feasible.

iii. Consider ways and information needed to identify appropriate thresholds for Audits/Surveys with or without WMPs from the top 100 water users or top 20% of users, possibly scaled for size of supplier or number of CII customers
    1. Should Water Provider include itself in the assessment of top users.
    2. Metrics that could be used to define thresholds (Water Provider size, number of CII accounts, volume of CII, top 20%, top 100, etc.).
    3. Refer to *A Guide to Customer Water-Use Indicators for Conservation and Financial Planning* (Vickers et al., 2013).

12. References
13. Appendices

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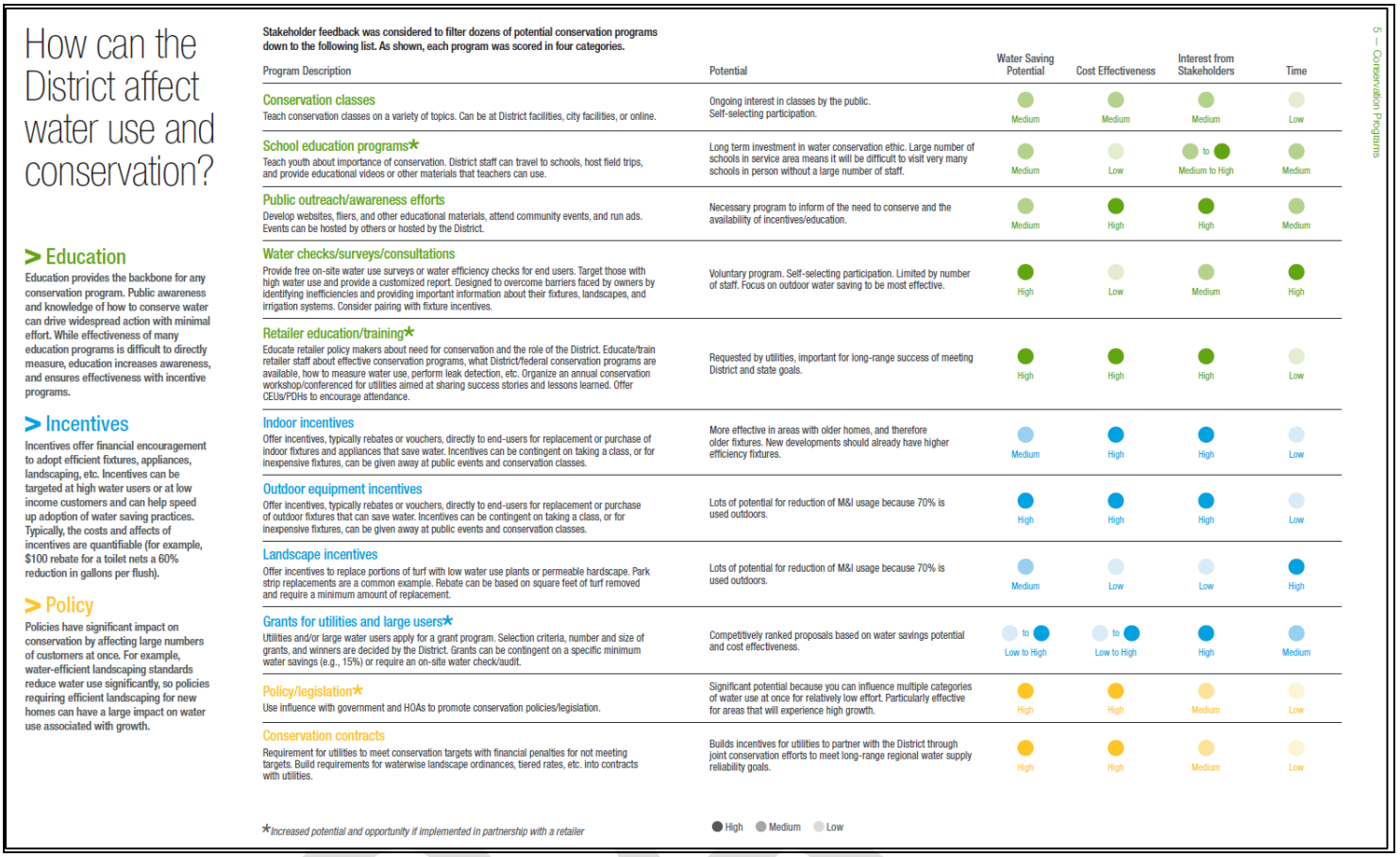
Figure 1. Sample Dot Matrix of Best Management Descriptions



How can the District affect water use and conservation?

> Education

Education provides the backbone for any conservation program. Public awareness and knowledge of how to conserve water can drive widespread action with minimal effort. While effectiveness of many education programs is difficult to directly measure, education increases awareness, and ensures effectiveness with incentive programs.

> Incentives

Incentives offer financial encouragement to adopt efficient fixtures, appliances, landscaping, etc. Incentives can be targeted at high water users or at low income customers and can help speed up adoption of water saving practices. Typically, the costs and affects of incentives are quantifiable (for example, $100 rebate for a toilet nets a 60% reduction in gallons per flush).

> Policy

Policies have significant impact on conservation by affecting large numbers of customers at once. For example, water-efficient landscaping standards reduce water use significantly, so policies requiring efficient landscaping for new homes can have a large impact on water use associated with growth.

Stakeholder feedback was considered to filter dozens of potential conservation programs down to the following list. As shown, each program was scored in four categories.

Program Description	Potential	Water Saving Potential	Cost Effectiveness	Interest from Stakeholders	Time
Conservation classes Teach conservation classes on a variety of topics. Can be at District facilities, city facilities, or online.	Ongoing interest in classes by the public. Self-selecting participation.	Medium	Medium	Medium	Low
School education programs* Teach youth about importance of conservation. District staff can travel to schools, host field trips, and provide educational videos or other materials that teachers can use.	Long term investment in water conservation ethic. Large number of schools in service area means it will be difficult to visit very many schools in person without a large number of staff.	Medium	Low	Medium to High	Medium
Public outreach/awareness efforts Develop websites, fliers, and other educational materials, attend community events, and run ads. Events can be hosted by others or hosted by the District.	Necessary program to inform of the need to conserve and the availability of incentives/education.	Medium	High	High	Medium
Water checks/surveys/consultations Provide free on-site water use surveys or water efficiency checks for end users. Target those with high water use and provide a customized report. Designed to overcome barriers faced by owners by identifying inefficiencies and providing important information about their fixtures, landscapes, and irrigation systems. Consider pairing with fixture incentives.	Voluntary program. Self-selecting participation. Limited by number of staff. Focus on outdoor water saving to be most effective.	High	Low	Medium	High
Retailer education/training* Educate retailer policy makers about need for conservation and the role of the District. Educate/train retailer staff about effective conservation programs, what District/federal conservation programs are available, how to measure water use, perform leak detection, etc. Organize an annual conservation workshop/conferenced for utilities aimed at sharing success stories and lessons learned. Offer CEUs/PDHs to encourage attendance.	Requested by utilities, important for long-range success of meeting District and state goals.	High	High	High	Low
Indoor incentives Offer incentives, typically rebates or vouchers, directly to end-users for replacement or purchase of indoor fixtures and appliances that save water. Incentives can be contingent on taking a class, or for inexpensive fixtures, can be given away at public events and conservation classes.	More effective in areas with older homes, and therefore older fixtures. New developments should already have higher efficiency fixtures.	Medium	High	High	Low
Outdoor equipment incentives Offer incentives, typically rebates or vouchers, directly to end-users for replacement or purchase of outdoor fixtures that can save water. Incentives can be contingent on taking a class, or for inexpensive fixtures, can be given away at public events and conservation classes.	Lots of potential for reduction of M&I usage because 70% is used outdoors.	High	High	High	Low
Landscape incentives Offer incentives to replace portions of turf with low water use plants or permeable hardscape. Park strip replacements are a common example. Rebate can be based on square feet of turf removed and require a minimum amount of replacement.	Lots of potential for reduction of M&I usage because 70% is used outdoors.	Medium	Low	Low	High
Grants for utilities and large users* Utilities and/or large water users apply for a grant program. Selection criteria, number and size of grants, and winners are decided by the District. Grants can be contingent on a specific minimum water savings (e.g., 15%) or require an on-site water check/audit.	Competitively ranked proposals based on water savings potential and cost effectiveness.	Low to High	Low to High	High	Medium
Policy/legislation* Use influence with government and HOAs to promote conservation policies/legislation.	Significant potential because you can influence multiple categories of water use at once for relatively low effort. Particularly effective for areas that will experience high growth.	High	High	Medium	Low
Conservation contracts Requirement for utilities to meet conservation targets with financial penalties for not meeting targets. Build requirements for waterwise landscape ordinances, tiered rates, etc. into contracts with utilities.	Builds incentives for utilities to partner with the District through joint conservation efforts to meet long-range regional water supply reliability goals.	High	High	Medium	Low

**Increased potential and opportunity if implemented in partnership with a retailer*

● High ● Medium ● Low

5 – Conservation Programs

Source: Brown and Caldwell/Maddaus Water Management Inc.

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3. PRELIMINARY LITERATURE REVIEW

The following is an initial list of currently known references related to CII facility water use efficiency for review and comment. All of the following links were accessed in May 2021 unless otherwise indicated.

CII Guidance and Reference Documents List (as of May 2021)

Alliance for Water Efficiency. (2018). *Commercial Kitchens Guide.* https://www.allianceforwaterefficiency.org/impact/our-work/commercial-kitchens-guide

American Water Works Association. (2013). *AWWA G480-13 Water Conservation Program Operation and Management Standard*. https://www.awwa.org/Store/Product-Details/productId/36141161

Arizona Municipal Water Users Association. (2008). *Facility Manager's Guide to Water Management*. http://www.amwua.org/pdfs/facility_managers_guide.pdf

Boston University Institute for Sustainable Energy. (2019). *Water Utility of the Future: A Case Study of Conservation as a Service.* http://www.bu.edu/ise/files/2019/10/Water-Utility-of-the-Future-A-Case-Study-of-Conservation-as-a-Service_FINAL.pdf

Bourg, Joseph. (2016). Web page: Whole Building Design Guide Resource Pages, Water Conservation. https://www.wbdg.org/resources/water-conservation

California Department of Water Resources. (2014). *Commercial, Industrial, and Institutional Task Force Best Management Practices Report to the Legislature Volume I*. http://toolbox.calwep.org/wiki/File:CII_Volume-I_July_2014.pdf

Ibid. (2014). *Commercial, Industrial, and Institutional Task Force Best Management Practices Report to the Legislature Volume II.* http://toolbox.calwep.org/wiki/File:CII_Volume-II_July_2014.pdf

California Primer on Conservation Way of Life. (2018). https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Water-Use-And-Efficiency/Make-Water-Conservation-A-California-Way-of-Life/Files/PDFs/Final-WCL-Primer.pdf

California Code of Regulations. (2021). Article 4. Title 20 Appliance Efficiency Regulation. https://www.energy.ca.gov/rules-and-regulations/appliance-efficiency-regulations-title-20City Energy. (2019). *Water Audit Guidance for Commercial Buildings.* https://www.cityenergyproject.org/wp-content/uploads/2019/05/City_Energy_Project_Resource_Library_Water_Audit_Guidance_For_Commercial_Buildings.pdf

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Department of the Army. (2011). Public Works Technical Bulletin No. 200-1-85, Installation Water Audit Guidelines. https://www.wbdg.org/FFC/ARMYCOE/PWTB/pwtb_200_1_85.pdf

Ibid. Public Works Technical Bulletin No. 200-1-104, Implementing a Water Conservation Program on Army Installations. https://www.wbdg.org/FFC/ARMYCOE/PWTB/pwtb_200_1_104.pdf

Ibid. (2011). Public Works Technical Bulletin No. 200-1-105, Water-Efficient Installations. https://www.wbdg.org/FFC/ARMYCOE/PWTB/pwtb_200_1_105.pdf

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Ibid. (1993). Public Works Technical Bulletin No. 420-46-2, Procedure to Detect Water Distribution System Leaks. https://www.wbdg.org/FFC/ARMYCOE/PWTB/pwtb_420_46_2.pdf

Dziegielewski, B., J. C. Kiefer, W. DeOreo, P. Mayer, E. M. Opitz, G. A. Porter, G. L. Lantz, and J. O. Nelson. (2000). *Commercial and Institutional End Uses of Water*. Denver, Colorado: AWWA, Research Foundation and American Water Works Association with Cooperation of the U.S. Bureau of Reclamation. Catalog No.90806. 264 pp. ISBN 1-58321-035-0. https://www.waterrf.org/resource/commercial-and-institutional-end-uses-water

Dziegielewski, B. 2016. *National Survey of Commercial, Industrial and Institutional Water*

National Renewable Energy Laboratory. (2017). *Cooling Tower (Evaporative Cooling System) Measurement and Verification Protocol*. https://www.nrel.gov/docs/fy18osti/70219.pdf

National Resources Defense Council (NRDC). (2009). Making Every Drop Work. https://www.nrdc.org/sites/default/files/cacii.pdf

Nevada Governor's Office of Energy. Public Building Water Auditing Best Practices. http://energy.nv.gov/uploadedFiles/energynvgov/content/Programs/Public%20Building%20Water%20Auditing%20Best%20Practices.pdf

Office of Federal Sustainability. (2013*). Implementing Instructions: Federal Agency Implementation of Water Efficiency and Management Provisions of EO 13514*. https://www.sustainability.gov/pdfs/water_implementing_instructions.pdf

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South Florida Water Management District. (2013). *Self-Assessment Guide for Commercial and Institutional Water Efficiency Improvement.* https://issuu.com/southfloridawatermanagement/docs/water_efficiency_improvement_guide?mode=window&proSidebarEnabled=true&backgroundColor=%23222222

U.S. Environmental Protection Agency (EPA). (2016). *Best Practices to Consider When Evaluating Water Conservation and Efficiency as an Alternative for Water Supply Expansion*. https://www.epa.gov/sites/production/files/2016-12/documents/wc_best_practices_to_avoid_supply_expansion_2016_508.pdf

Ibid. (2009). Water Efficiency in the Commercial and Institutional Sector: Considerations for a WaterSense Program. https://www.epa.gov/sites/production/files/2017-03/documents/ws-commercial-ci-whitepaper.pdf

Ibid. (2017). *Water Efficiency Management Guide, Mechanical Systems.* https://www.epa.gov/sites/production/files/2017-12/documents/ws-commercialbuildings-waterscore-mechanical-systems-guide.pdf

Ibid. (2017). *WaterSense at Work*. https://www.epa.gov/sites/production/files/2017-02/documents/watersense-at-work_final_508c3.pdf

Ibid. WaterSense® Simple Water Assessment Checklist for Commercial and Institutional Facilities. https://www.epa.gov/sites/production/files/2017-01/documents/ws-commercial-water-assessment-checklist.pdf

Ibid. WaterSense web page: Tools for CI Facilities. https://www.epa.gov/watersense/tools-ci-facilities

United Nations. (2007). *Indicators of Sustainable Development: Guidelines and Methodologies*, 3rd Edition. https://sustainabledevelopment.un.org/content/documents/guidelines.pdf

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Kiefer, J. C., L. Krentz, and B. Dziegielewski. (2015.) *Methodology for Evaluating Water Use in the Commercial, Institutional, and Industrial Sectors.* Project #4375. https://www.waterrf.org/resource/methodology-evaluating-water-use-commercial-institutional-and-industrial-sectors

Vickers, A., M. Wyatt Tiger, and S. Eskaf. (2013.) *A Guide to Customer Water-Use Indicators for Conservation and Financial Planning A Guide to Customer Water-Use Indicators for Conservation and Financial Planning*. American Water Works Association. https://www.researchgate.net/publication/277477322_A_Guide_to_Customer_Water-Use_Indicators_for_Conservation_and_Financial_Planning

4. NEXT STEPS

The next steps envisioned are as follows:

- Present at a future Workgroup Workshop and stakeholder meeting to solicit input on the approach outlined.
- Collaborate on refining the draft outline based on Workgroup and stakeholder feedback.
- Continue to review and refine the references list with input by DWR staff and others.
- Begin drafting the technical paper.
- Seek input on the technical recommendations through an involved stakeholder process.
- Submit final technical white paper to support DWR Legislative Report due in October 2021.

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Preliminary BMP/Conservation Measures List

Prepared by Maddaus Water Management, Inc.

March 17, 2021

Equipment or Program Type	Specific Program	Focus of Program	Voluntary, Incentive or Required of Customers (Ordinance)?	Measure Description
Education/Incentive	Focused Indoor Water Audits	CII Indoor	Incentive	Provide free water audits to hotels and motels. Standardize on the types of services offered to reduce costs. Included would be bathrooms, kitchens, ice machines, laundry, cooling towers, landscaping, and irrigation systems and schedules.
Education/Incentive	Irrigation Survey/Audit	CII Outdoor	Incentive	Free irrigation water audit provided to CII Properties. Maybe included with indoor surveys.
Education	Top CII Water Users In Service Area Program	CII Indoor/ Outdoor	Incentive	Screen for largest CII water customers to be offered a free water survey that would evaluate ways for the business to save water and money.
Education/Incentive	Water Management Plan	Both		CII water customers provided a water management plan based on results of the survey.

Equipment or Program Type	Specific Program	Focus of Program	Voluntary, Incentive or Required of Customers (Ordinance)?	Measure Description
Education	Recognition Programs for Water Savings by Businesses	CII Indoor/ Outdoor	Voluntary	Sponsor a recognition program for businesses that significantly reduce water use. They would receive a plaque/recognition.
Education	Efficient Outdoor Use Education and Training Programs	SF/MF/CII Outdoor	Voluntary	Utility would offer, organize and sponsor a series of educational workshops or other means for educating landscapers and contractors in efficient landscaping and irrigation principals.
Education	Promote Green Buildings	ALL	Voluntary	Assign staff a position to work with local Green Building associations, developers, designers, vendors to promote incorporating water efficiency into building design. Possibly work with other partner utilities or agencies energy/wastewater/storm water. Co-sponsor award program. Partner with green real estate initiatives and/or local developers to promote EPA WaterSense Certified Homes program. More information here: https://www.epa.gov/watersense/watersense-labeled-homes
Education	Large Landscape Water Budget Program (non-regulatory)	CII Outdoor	Incentive	Large landscape water budget program provides incremental report of expected water use compared to actual water use. Primary goal is to serve as a communication tool between stakeholders (i.e. property operator, irrigation technician, etc.). Common example is Waterfluence but can be performed inhouse.
Incentives	Indoor Plumbing Fixture Upgrades	CII Indoor	Incentive	Support installation of high efficiency indoor plumbing fixtures including: showerheads, faucets, aerators, high efficiency urinals, high efficiency toilets. This may include rebate, incentive,

Equipment or Program Type	Specific Program	Focus of Program	Voluntary, Incentive or Required of Customers (Ordinance)?	Measure Description
				giveaway, direct installation, or similar program.
Incentives	Install High Efficiency Fixtures in Government Buildings	CII Indoor	Incentive	Install high efficiency faucets, toilets, urinals and showerheads in City or Utility facilities. Could also offer incentives for similar installations in other government buildings (such as utility pays for all or part of fixture cost, and building owner providing installation.)
Incentives	High Efficiency Washer Rebate	CII Indoor	Incentive	Provide a rebate or incentive for the installation of a high efficiency commercial washer (HEW).
Incentives	Financial Incentives for Landscape Upgrades	CII Outdoor	Incentive	Support a Smart Landscape Rebate Program with incentives for substantive landscape retrofits or installation of water efficient upgrades including purchase and installation of water-wise plants, compost, and mulch. Landscape upgrades might include conversion of turf to lower-water-using turf varieties.
Incentives	Financial Incentives for Irrigation Upgrades	CII Outdoor	Incentive	Irrigation Equipment upgrades may include, but not limited to, soil moisture sensors, flow sensors, in-stem flow regulators, plumbing flow control valve, Split Service Incentive (splits mixed use meters into indoor and outdoor), laminar flow restrictors, rain shut off sensors, conversion to drip systems, large rotary spray nozzle installation, etc.
Incentives	Landscape Conversion or Turf Removal	CII Outdoor	Incentive	Provide a per square foot incentive for to remove turf and replace with low water use plants or hardscape. Landscape conversion could include conversion of turf to lower-water-using turf varieties. Rebate based on price per square foot removed and capped at an upper limit for multifamily or commercial residence.

Equipment or Program Type	Specific Program	Focus of Program	Voluntary, Incentive or Required of Customers (Ordinance)?	Measure Description
Incentives	Weather-Based Irrigation Controller Rebates	CII outdoor	Incentive	Support installation of a weather-based irrigation controller. These controllers have on-site weather sensors or rely on a signal from a central weather station that modifies irrigation times at least weekly. Requires local irrigation contractors who are competent with these products, so may require sponsoring a training program in association with this measure. This may include rebate, incentive, giveaway, direct installation, or similar program.
Incentives	Rotating Sprinkler Nozzle Rebates	CII Outdoor	Incentive	Support replacement of standard spray sprinkler nozzles with rotating nozzles that have lower application rates. This may include rebate, incentive, giveaway, direct installation, or similar program.
Incentives	Pressure Regulation	Both	Incentive	Support installation of pressure regulators or ACV. This may include rebate, incentive, giveaway, direct installation, or similar program.
Incentives	Provide Incentive for Large Rainwater Catchment Systems	CII Outdoor	Incentive	Provide incentive for installation of large rainwater catchment systems. This may include rebate, incentive, giveaway, direct installation, or similar program.
Incentives	Provide Incentive for Large Stormwater Catchment Systems	CII Outdoor	Incentive	Support installation of large stormwater catchment systems. Stormwater catchment refers to surface water from rainfall events, not roof water. This may include rebate, incentive, giveaway, direct installation, or similar program.
Incentives	Customized Top Users Incentive Program	Both	Incentive	Water Provider to provide customer financial incentives based on water survey findings. Incentives are tailored to each individual site as each site has varying water savings potentials.

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Equipment or Program Type	Specific Program	Focus of Program	Voluntary, Incentive or Required of Customers (Ordinance)?	Measure Description
Incentives	CII Rebates to Replace Inefficient Equipment	Both	Incentive	Support upgrading to water efficiency technology from a standard list of water efficient equipment. Included would be x-ray machines, icemakers, air-cooled ice machines, steamers/steam cookers, washers, spray valves, efficient dishwashers, replace once through cooling, and add conductivity meters on cooling towers. This may include rebate, incentive, giveaway, direct installation, or similar program. Garbage disposal, washing and sanitation, combination ovens, steam kettles, laundry operations, medical and lab equipment, vivarium and aquariums, fabric cleaning and washing equipment, industrial equipment, etc.
Incentives	Water Savings Performance Program	Both	Incentive	Water provider sponsored Water Savings Performance program provides financial incentive per gallons saved to sites within the Utility service area.
Incentives	Restaurant Spray Nozzles	CII Indoor	Provide for free (could be a bulk purchase)	Support installation of 1.15 gpm (or lower) spray nozzles and possibly free installation for the rinse and clean operation in restaurants and other commercial kitchens.
Incentives	Dipper Wells	CII Indoor	Incentive	Provide a dipper well device incentive for relevant food service accounts. Devices save water and money using less than 600 gallons of water per year.
Incentives	School Building Retrofit	Both	Incentive	School retrofit program wherein school receives a grant to replace fixtures and upgrade irrigation systems. Might target university and college campuses.
Incentives	Hotels/Motels Retrofit with Financial Assistance	Both	Incentive	Following a free water audit offer motels a rebate for equipment identified that would save water. Or provide a rebate schedule for certain efficient equipment such as air-cooled ice machines that motels could apply for without an audit.

Equipment or Program Type	Specific Program	Focus of Program	Voluntary, Incentive or Required of Customers (Ordinance)?	Measure Description
Incentives	Rebates for Sub meters on Cooling Towers	Both/cooling	Incentive	Support installation of submeters to measure the make-up and bleed-off water of the facility cooling towers. This may include rebate, incentive, giveaway, direct installation, or similar program.
Incentives	Rebates for Conductivity Controllers on Cooling Towers	Both/cooling	Incentive	Support installation of advanced cooling tower controllers to reduce bleed-off water of the facility cooling towers. This may include rebate, incentive, giveaway, direct installation, or similar program.
Incentives	Dry Vacuum Pump	CII Indoor	Incentive	Support installation of dry vacuum pumps. This may include rebate, incentive, giveaway, direct installation, or similar program.
Incentives	Dry Heat Sterilization in the Pharmaceutical Industry (versus steam)	CII Indoor	Incentive	Support installation of dry heat sterilization (versus steam). This may include rebate, incentive, giveaway, direct installation, or similar program.
Incentives	Alternate Onsite Sources of Non-Potable Water	Both	Incentive	Alternate onsite sources are different from recycled water. Many factors have converged to encourage the use of the alternate onsite non-potable sources of water. Commercial and institutional facilities also have significant opportunities to capture and reuse a variety of alternate onsite sources for non-potable applications.
Incentives	Building Meters, Submeters, and Management Systems	Both	Incentive	Tracking total property water use as well as specific uses within the building(s) is a key component of facility management efforts and essential to managing water costs and maintaining systems and processes on the property.
Incentives	Replace single-pass cooling equipment	Both/cooling	Incentive	Types of equipment that often use single-pass cooling include: Chillers or other refrigeration systems, Condensers, air compressors, hydraulic equipment, CAT scanners, degreasers, welding machines, vacuum pumps, X-ray equipment, ice machines, wok stoves, etc.

Equipment or Program Type	Specific Program	Focus of Program	Voluntary, Incentive or Required of Customers (Ordinance)?	Measure Description
Incentives	Alternate Sources of Water and Recirculated Water Use	Both	Incentive	Use of alternative sources and recirculated water is a best management practice for all industries. This may include condensate, RO water, water reuse systems, grey water, stormwater, etc.
Policy	Fixture Retrofit on Resale or Name Change on Water Account	ALL	Ordinance	Work with the real estate industry to require a certificate of compliance be submitted to the Utility that verifies that a plumber has inspected the property and efficient fixtures were either already there or were installed before close of escrow.
Policy	Pressure Regulation at Individual Properties	ALL	Incentive/ Ordinance	Water Providers can ensure installation of pressure regulators at CII properties where pressure is above a certain level and pressure regulation is found to be lacking or inadequate.
Policy	Install AMI	ALL	N/A	Retrofit system with AMI meters and associated network capable of providing continuous consumption data to Utility offices. Features may include online customer access to their usage and leak alerts.
Policy	Install AMI New Development	ALL	Requirement	Require that new customers install AMI meters as described above. The AMI system would, on demand, indicate to the customer and Utility where and how their water is used, facilitating water use reduction and prompt leak identification.
Policy	Targeted AMI data to specified customer categories	ALL	Service	Establish a real-time data collection and communication protocol with Top _% Users.
Policy	Require Fixture Replacement by a Deadline	ALL	Ordinance	Utility would pass an ordinance that requires CII facilities to bring fixtures up to efficient standard by a fixed date at their own expense.

Equipment or Program Type	Specific Program	Focus of Program	Voluntary, Incentive or Required of Customers (Ordinance)?	Measure Description
Policy	Require Weather Adjusting Smart Irrigation Controllers and/or Rain Sensors in New Development	ALL	Ordinance	Require developers for all commercial development to install the weather-based irrigation controllers. Some utilities offer rebates for rain sensors. For example, see CALGreen building code that requires this on all new buildings with an irrigation system.
Policy	Prohibit Water Waste and Practices	All Outdoor	Ordinance	Adopt or modify ordinance that prohibits the waste of water defined as gutter flooding and failure to repair leaks in a timely manner.
Policy	Require Plan Review for new CII	CII Indoor/ Outdoor	Ordinance	Require plan reviews for water use efficiency for all new business customers.
Policy	Hotels/Motels Retrofit	CII Indoor	Mandatory	Require schedule for certain efficient plumbing fixtures be replaced by a deadline.
Policy	Prohibit Once through Cooling, Non-Recycling Fountains, Water Wasting Fixtures and Practices	CII	Ordinance	Prohibit certain obvious wastes of water in new facilities, such as those listed. Consider requiring retrofits of existing situations, allowing reasonable time for compliance.

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