

Utilities electric • stormwater • wastewater • water 222 Laporte Ave. PO Box 580 Fort Collins, CO 80522-0580

970.212.2900 V/TDD: 711 utilities @fcgov.com fcgov.com/utilities

Ben Wade Colorado Water Conservation Board 1313 Sherman Street, Room 718 Denver, CO 80203

Dear Mr. Wade,

Fort Collins Utilities recognizes the importance of increasing water efficiency in the commercial, institutional, and industrial (CII) sector. We believe that the commercial water efficiency training, outlined in the attached grant application, would benefit our programs and create a platform to collaborate on CII efficiency across the state. Additionally the training aligns with our conservation goals to increase efficiency in the CII sector, outlined in Fort Collins Utilities' Water Conservation Plan, and the State's conservation goals, outlined in Section 6.3 of the Colorado Water Plan. Due to these benefits, and on behalf of the City of Fort Collins, Fort Collins Utilities respectfully provides this letter as a commitment to provide the required 25% of the total project budget through in-kind services.

The project is estimated to cost \$22,621.55. Fort Collins Utilities is requesting \$14,540.00 from the Colorado Water Conservation Board (CWCB) and aims to provide \$8,402.65 of in-kind services through outreach, logistics coordination, writing progress reports, and networking planning and facilitation. Specifically, Abbye Neel, Water Conservation Specialist, Liesel Hans, Water Conservation Manager, and Dan Clark, Key Accounts Representative, will work on the project. It is expected that Abbye Neel will contribute 150 hours, Liesel Hans will contribute 60 hours, and Dan Clark will contribute 20 hours over the course of the year-long project. If awarded, the in-kind services comprise 37% of total estimated project cost, meeting CWCB's requirement of a 25% funding match. Thank you for your time and consideration of this proposal.

Sincerely,

DocuSigned by: abbye M C6FBD13420D8439

12/1/2017

Abbye Neel Water Conservation Specialist aneel@fcgov.com 970-416-4371

DocuSigned by: D26F82549AF34D1

12/1/2017

Liesel Hans Water Conservation Manager <u>Ihans@fcgov.com</u> 970-221-6877



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970.212.2900 V/TDD: 711 utilities @fcgov.com fcgov.com/utilities

Ben Wade Colorado Water Conservation Board 1313 Sherman Street, Room 718 Denver, CO 80203

Dear Mr. Wade,

On behalf of the City of Fort Collins, we respectfully submit Fort Collins Utilities' proposal for the water efficiency grant to the Water Resource Conservation Public Education Grant program to facilitate a commercial water efficiency training.

Utilities across Colorado do not feel like they have the tools to implement commercial, institutional, and industrial (CII) programming. Our proposal will provide utilities across Colorado with the knowledge and skills to effectively audit and understand water end use in the CII sector.

Fort Collins Utilities will collaborate with industry expert Michelle Maddaus, from Maddaus Water Management, and interested utilities to develop a schedule that incorporates interests and needs of participants to provide maximum value.

Training directly supports Colorado's larger conservation goals, including those outlined in Chapter 6.3, *Water Conservation and Reuse*, of Colorado's Water Plan, as well as addresses the large knowledge gap for organizations trying to implement CII programing. Additionally the training serves as a platform, by establishing a knowledge base and expectations of successful CII programing, for future conversation and collaboration to address efficiency within the CII sector across Colorado.

Sincerely,

DocuSigned by: abbye Mel C6EBD13420D8439

12/1/2017

Abbye Neel Water Conservation Specialist aneel@fcgov.com 970-416-4371

DocuSigned by: iesel Hairs D26F82549AF34D1

12/1/2017

Liesel Hans Water Conservation Manager <u>Ihans@fcgov.com</u> 970-221-687



Fort Collins Utilities Proposal for Water Efficiency Grant Award

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Background

The commercial, institutional, and industrial (CII) sector includes hotels, restaurants, hospitals, laboratories, government/military institutions, and manufacturing. Accounting for 17 percent of overall water use in the United States, the CII sector is the second largest end user of public water supply (EPA 2012). In most major Colorado cities, the CII sector comprises an even larger percentage of withdrawals making up 23 percent of Denver's, 42 percent of Fort Collins', and 29 percent of Colorado Springs' end use (DW 2017; CFU 2015; CSU 2015). Despite the CII sectors' significant use of water, even for the largest Front Range utilities, CII conservation programs only make up 15 to 25 percent of annual savings (CFU 2016; CSU 2015). Furthermore, many Colorado Utilities lack CII programing all together. While total savings are tied to utility size, the 2016 American Water Works Association *National Survey of Commercial, Industrial, and Institutional Water Efficiency Programs* reported that CII programing saved surveyed utilities an average of 377 acre-feet (123 million gallons) a year (AWWA 2016). With the Colorado Water Plan goal to save 400,000 acre feet of water through conservation by 2050, CII efficiency opportunities must be part of Colorado's solution (CWP 2015; CWWE 2016).

CII programing is universally recognized as a best practice for utilities. CII programs in places like California and Arizona have citied potential water savings between 15 to 35 percent and the Colorado Water Wise Technical guide for Water Conservations lists both CII rebate programing and specialized commercial audits in their top fourteen best management practices (Dziegielewski 2000; CWW 2010). While a handful of utilities have rebate opportunities for CII customers, only Denver Water, Fort Collins Utilities, City of Greeley, and Thornton Water publically offer specialized CII audits. Furthermore, of the cities with audit programs, many are limited in scope. For example, Fort Collins' program is a joint energy-water audit that historically has focused on energy recommendations due to auditors' limited knowledge about complex water processes. Our research has found that other programs do not address more than sink aerators, toilets, and urinals, functioning like a residential audit program as opposed to a commercial audit program.

Commercial audits are particularly important because utilities need to understand *how* CII customers are using water in order to develop effective CII programs. Compared to the residential sector, however, the CII sector is more challenging due to a variety of complex water processes and less consistent and predictable end use. CII efforts require granular site-specific knowledge on top of traditional billing data analysis, including information about the facility's operations, occupancy, end uses, building age and more. A recent survey, sent by Fort Collins Utilities to Colorado utilities, cited the following limitations to CII program implementation and audits:

- difficulties identifying and quantifying savings in facilities
- challenges benchmarking to identify efficient use
- lack of knowledge of specialized CII systems (e.g. cooling towers, pools)

To add to these limitations, very few hands-on-resources exist to educate about water use in the CII sector. While various manuals exist, most are outdated and it is difficult for staff to learn how to effectively audit businesses without hands-on exposure and experience (Appendix A).

Utilities across Colorado do not feel like they have the tools to implement CII programming. While manuals provide background information, in order to be able to perform in the field one



must learn in the field. CII audits are estimated to save 0.27 acre feet (88,200 gallons) (Seneviratne 2006). Assuming a utility could perform 100 audits a year, savings could be over 27 acre feet (8.8 million gallons). Realized savings could be higher if high use sectors are targeted.

We are requesting \$14,540 to host a hands-on CII Water Efficiency workshop for approximately 10 – 15 utilities. With this focused technical training, participants will gain skills to identify and address conservation and efficiency opportunities and strategies in the commercial sector. Specifically, the goal of the workshop will be to provide Colorado utilities hands-on learning over the course of three eight-hour training days, including classroom style lessons about data analysis and benchmarking, coupled with three to five commercial site visits. Participants will gain the knowledge and tools to improve or implement CII programming and ultimately help their CII customers improve efficiency and reduce waste. The training will also help cultivate a community of Colorado professionals where questions, challenges, and successes surrounding efficiency in the CII sector can be posed and answered. By establishing best practices, training followed by collaboration and networking will result in better CII programming and water efficiency results across Colorado.

Name and contact information of entity seeking grant

Applicant: City of Fort Collins Contact: Abbye Neel P.O Box 580 Fort Collins, CO 80522-0580 Tax ID: 846000587 970 - 416 - 4371 aneel@fcgov.com

Abbye Neel, Water Conservation Specialist at Fort Collins Utilities, will be the project manager and primary contact for this project. She will oversee training coordination and planning, participant outreach, logistics, and help facilitate training and follow-up sessions.

Liesel Hans, Water Conservation Manager at Fort Collins Utilities, will be the administrative project champion, overseeing project implementation, outcomes, and providing support and guidance as needed.

Dan Clark, Key Accounts Representative at Fort Collins Utilities, will help coordinate with local businesses to organize on-site field visits for the hands-on training component.

Fort Collins Utilities background information

Fort Collins Utilities' water sources are surface supplies coming from the Poudre River and the Colorado Big Thompson Project. Fort Collins Utilities serves 35,102 customers. Single family makes up the largest percentage of accounts (82%), followed by commercial (7%), multi-family (7%), and duplex (4%). Despite making up 7% of the Utilities' accounts commercial customers use 42% of treated water. Single family uses 31% of treated water, followed by multifamily (13%), and duplex (2%). The remaining percentage of treated water is lost in system processes. More information regarding Fort Collins Utilities service area population, treated water demand, per capita use, and water conservation program savings can be found in Table 1.1.



| Year | Service | Annual | Annual Treated | Weather | Water |
|------|------------|-------------|-------------------|-----------------|-------------------|
| | Area | Treated | Water Delivery | Normalized | Conservation |
| | Population | Water | (Million Gallons) | Average Use | Program |
| | (1,000s) | Delivery | | per Person | Savings by Year |
| | | (Acre Feet) | | (Gallons Per | (Million Gallons) |
| | | | | Capita Per Day) | |
| 2012 | 129.2 | 26,835 | 8,757 | 152 | 24.2 |
| 2013 | 129.2 | 23,201 | 7,560 | 147 | 20.1 |
| 2014 | 130.2 | 22,822 | 7,437 | 143 | 25.0 |
| 2015 | 131.5 | 23,323 | 7,600 | 146 | 50.0 |
| 2016 | 132.8 | 25,825 | 8,415 | 145 | 70.0 |

Table 1.1 Summary of Fort Collins Utilities Service Information

Fort Collins Utilities uses three planning criteria to ensure adequacy, stability, and reliability of the water system. Specifically Fort Collins Utilities must be able to meet the planning demand level in a 1-50 year drought, have a 20 percent storage reserve factor to provide short-term supply in emergency or drought situations, and a higher than average planning demand level to ensure future supplies and/or facilities are acquired if needed. Planning criteria and assumptions are conservative to try and account for climate change and population growth. Current projections from the Traffic Analysis Zone study, Larimer County, and City of Fort Collins suggest that the Fort Collins Utilities service area will reach buildout in 2040. While there may still be redevelopment, it is assumed that after 2040 population growth will begin to decline. Figure 1.1 outlines future population projections in relation to treated water demand. Additional information about Fort Collins Utilities' Water adequacy, stability, reliability, and demand management can be found in Section 1.2 and 2.4 of Fort Collins Utilities; Water Efficiency Plan(CFU 2015).



Figure 1.1 Treated water demand, historical planning levels, and population



Entities that will be included in outreach efforts

Through a preliminary survey conducted by Fort Collins Utilities, fourteen Colorado entities, primarily along the Front Range, have expressed interest in attending a CII training. Due to space limitations during the commercial site visits, attendance will be capped at 20 people per day.

In order to include as many organizations as possible, workshop advertising will be conducted across Colorado through organizations such as the Rocky Mountain Section AWWA Conservation Committee and Colorado Water Wise. Priority will be given to utility staff in water conservation, water resource engineering, or other departments that work with commercial customers or want to expand their commercial conservation programming. We will also invite third party companies or consultants who are currently or planned to be hired to help utilities conduct commercial audits.

Selected agent to deliver training

Fort Collins Utilities has identified Michelle Maddaus from Maddaus Water Management (MWM) as an optimal contractor to provide the training. Michelle is a registered P.E. with over 18 years of experience in the industry. MWM has worked in conservation since its inception in 1995, has overseen 15 hands-on field based CII audit trainings between 2012 – 2017, and is one of the only firms that offers CII efficiency audit training in the United States. See Appendix A for Michelle's qualifications as the subject matter expert.

Goals of project

- 1. Provide training in methodologies and best practices for conducting commercial customer audits
- 2. Provide training as to how to gather data to effectively benchmark commercial facilities
- 3. Create networking group for Colorado utilities working in the CII sector
- 4. Identify future areas of opportunities to grow Colorado's conservation efforts in the CII sector (e.g. creation of Colorado CII benchmarking network)

Scope of work

Task 1 – Training Development, January 2018 – March 2018

Training development will occur in two phases.

Phase 1: Outreach to potential participants to raise awareness of the training opportunity, recruit participants, and gather input on specific topics and needs to ensure the training is effective, relevant, and productive.

Phase 2: Coordinate logistics including:

(1) Finalize training details with MWM

(2) Identify CII customers for site visits for approximately 14 participants and in-field portion of the training



(3) Gather and organize data required by MWM, including water use history and facility information for the selected site visits. MWM will provide three eight-hour days of hands-on-training that will include classroom style lessons about data analysis and benchmarking, coupled with three to five related commercial site visits.

The training will likely focus on the following categories of water use:

- 1. Toilets, Urinals, Showers, Faucets
- 2. Cooling Towers/Thermodynamics
- 3. Pools/Wash Down
- 4. Kitchens and Food Processing
- 5. Laundry, Recycling, Grey Water, Water Features, Leak Checks
- 6. Landscaping

Topics can be modified or added depending on groups' interest. In the field, MWM will cover data collection techniques. Interested participants will have access to a group license for water auditing software developed by MWM. Licenses last one year and all updates are included in the license. MWM will supply tablets, software, and water audit kits for use during the field portion of the course.

Once details have been finalized, Fort Collins Utilities will submit a 50% progress report outlining: (1) summary of contacts and outreach conducted and (2) final logistics for agenda, site visit locations, and dates. Estimated submittal date of March 2018.

Task 2 – Training Execution, April 2018

Fort Collins Utilities will help MWM facilitate the workshop. Fort Collins Utilities will provide classroom training space, travel to the site visits, and participant meals and snacks. Participants will be responsible for their own lodging, transportation to the training, and any additional meals outside of the training. Fort Collins Utilities will also administer a pre- and post- survey to gather feedback from participants. Upon completion of Task 2, Fort Collins Utilities will submit a 75% progress report summarizing: (1) final list of participants, (2) final agenda of training, and (3) initial feedback from training. Estimated submittal date of May 2018.

Task 3 – Follow Up & Network Development, November 2018

All attendees will be asked to attend a follow up meeting six months after the training. Fort Collins Utilities will provide meeting space and lunch. At the follow-up meeting Fort Collins Utilities will facilitate a conversation to identify: (1) feasibility of implementing training material, (2) for those that were able to implement training success and challenges surrounding CII benchmarking, and (3) areas of opportunity in the CII sector.

Fort Collins Utilities will submit a final report by end of 2018 summarizing attendees and feedback from workshop, along with suggestions for how CWCB can best support conservation in the CII sector.



Budget

| | | | | | | Fort Collins | |
|----------------------------------------------------------------------------------|----------|---------|-----------|----------|----------------------|----------------------|------------|
| | Abbye | Liesel | | Michelle | | Kind Service | CWCB Grant |
| | Neel | Hans | Dan Clark | Maddaus | Cost | Support | Request |
| Hourly Rate (\$/hr) | \$32.11 | \$45.26 | \$35.50 | \$210.00 | | | |
| | | н | OURS | | | | |
| Task 1 - Program Dev | velopmen | t | | | | | |
| Outreach (hours) | 10 | | 10 | | \$676.10 | \$676.10 | |
| Review Site Data, Training Coordiation, Meetings & Materials (hours) | | | | 30 | \$6,300.00 | | \$6,300.00 |
| Logisitics Coordination (hours) | 30 | 10 | 10 | | \$1,770.90 | \$1,770.90 | . , |
| 50% Progress | | 10 | 10 | | <i>\\\\\\\\\\\\\</i> | <i>\\\\\\\\\\\\\</i> | |
| Report (hours) | 20 | 10 | | | \$1,094.80 | \$1,094.80 | |
| Task 1 Subtotal | 60 | 20 | 20 | 30 | \$9,841.80 | \$3,541.80 | \$6,300.00 |
| | | | | | | | |
| Task 2 - Training Exe | cution | | | | | | |
| Conduct Audt (hours) | | | | 24 | \$5,040.00 | | \$5,040.00 |
| Travel for Michelle (Food, Car, Flight, Hotel) | | | | | \$2,000.00 | | \$2,000.00 |
| Food for Participants | | | | | \$450.00 | | \$450.00 |
| Logisitics Coordination (hours) | 10 | | | | \$321.10 | \$321.10 | |
| 75% Progress Report | 25 | 15 | | | \$1,481.65 | \$1,481.65 | |
| Total Cost Task 2 | 35 | 15 | 0 | 24 | \$9,292.75 | \$1,802.75 | \$7,490.00 |
| | | | | | | | |



| Task 3 - Follow Up & Networking | | | | | | | |
|------------------------------------------|----|----|---|---|-----------------------------------------------------|------------|--------------|
| Outreach (hours) | 5 | | | | \$160.55 | \$160.55 | |
| Logisitics Coordination (hours) | 10 | | | | \$321.10 | \$321.10 | |
| Networking Planning & Facilitation | 20 | 10 | | | \$1,094.80 | \$1,094.80 | |
| Training space | | | | | \$ 300.00 | | \$300.00 |
| Food for Participants | | | | | \$450.00 | | \$450.00 |
| Final Report | 25 | 15 | | | \$1,481.65 | \$1,481.65 | |
| Total Cost Task 3 | 60 | 25 | 0 | 0 | \$42,077.20 | \$3,058.10 | \$750.00 |
| | | | | | | | |
| Total | | | | | | \$8,402.65 | \$ 14,540.00 |
| | | | | | Fort Collins Utilities Percentage Match | 37% | |



References

- American Water Works Association (AWWA). (2016). National Survey of Commercial, Industrial and Institutional Water Efficiency Programs, (January). Retrieved from http://www.awwa.org/portals/0/files/resources/water knowledge/rc water conservation/awwasutilitysurveyofciiwaterefficiencyprogramsreport.pdf
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- Colorado Springs Utilities (CSU). (2015). Colorado Springs Utilities Water Use Efficiency Plan.
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- Environmental Protection Agency (EPA). (2012). Best Management Practices for Commercial and Institutional Facilities. Retrieved from https://www.epa.gov/sites/production/files/2017-01/documents/ws-commercial-factsheet-general-ci.pdf

Florida Water Star (FWS). (2015). Existing Building Commercial and Institutional Criteria.

- Harmon, J., Schneider, N., Rose, D., Rodriguez, J., & Garrido, N. (n.d.). Water Efficiency and Self-Conducted Water Audits at Commercial and Institutional Facilities.
- Seneviratne, Mohan. (2006). A Practical Approach to Water Conservation for Commercial and Industrial Faculties.



Appendix A CII Water Conservation Manual Overview

Below is a summary of the five most popular CII manuals in use today. Note, with one exception, all are almost ten years old.

1. Water Conservation Guide for Commercial, Institutional and Industrial Users, 1991, New Mexico Office State Engineer

Purpose:

- First published CII literature
- Outlines water use and best practices for government facilities, hospitals, hotels, office buildings, manufacturers, and service centers.
- 2. Commercial and Institutional End Uses of Water, 2002, AWWA

Purpose:

- Literature review of CII studies
- Established guidelines to characterize and benchmark efficient use in the CII sector.
- 3. Benchmarking Task Force Collaboration for Industrial, Commercial, and Institutional (ICI) Water Conservation, 2007, Colorado Water Wise

Purpose:

- Specific to Colorado
- Identify needs within the CII sector
- Analyze, normalize, and develop benchmarks for restaurants, schools, hotels/motels, and nursing homes/assisted living centers
- 4. WaterSmart Guidebook Water-Use Efficiency Plan Review Guide for New Businesses, 2008, East Bay Municipal Utility District

Purpose:

- Resource for new businesses, developers, consultants, designers, and planning agencies to identify water efficiency practices in new development
- 5. Water-Efficiency and Self-Conducted Water Audits at Commercial and Institutional Facilities, 2013, South Florida Water Management District

Purpose:

| Hourly Rate (\$/hr) | Abbye Neel \$32.11 | Liesel Hans \$45.26 H | Dan Clark \$35.50 OURS | Michelle Maddaus \$210.00 | Cost | Fort Collins Utilities In-Kind Service Support | CWCB Grant Request | | |
|-------------------------------------------------------------------------------|--------------------------|--------------------------------|------------------------------|---------------------------------|-------------------------------------------------|------------------------------------------------------|---------------------------------------------|--|--|
| Task 1 - Program Development | | | | | | | | | |
| Outreach (hours) | 10 | | 10 | | \$676.10 | \$676.10 | | | |
| Review Site Data, Training Coordiation, Meetings & Materials (hours) | | | | 30 | \$6,300.00 | | \$6,300.00 | | |
| Logisitics Coordination (hours) 50% Progress Report | 30 | 10 | 10 | | \$1,770.90 | \$1,770.90 | | | |
| (hours) | 20 | 10 | | | \$1,094.80 | \$1,094.80 | | | |
| Task 1 Subtotal | 60 | 20 | 20 | 30 | \$9,841.80 | \$3,541.80 | \$6,300.00 | | |
| Task 2 - Training Execut | ion | | | | | | | | |
| Conduct Audt (hours) | | | | 24 | \$5,040.00 | | \$5,040.00 | | |
| Travel for Michelle (Food, Car, Flight, Hotel) | | | | | \$2,000.00 | | \$2,000.00 | | |
| Food for Participants | | | | | \$450.00 | | \$450.00 | | |
| Logisitics Coordination (hours) | 10 | 15 | | | \$321.10 | \$321.10 | | | |
| Total Cost Task 2 | 35 | 15 | 0 | 24 | \$9,292,75 | \$1,481.05 | \$7,490.00 | | |
| Task 3 - Follow Up & Ne | etworking | | | | <i>40)20200</i> | <i>+_)</i> | <i></i> ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,, | | |
| Outreach (hours) | 5 | | | | \$160.55 | \$160.55 | | | |
| Logisitics Coordination (hours) | 10 | | | | \$321.10 | \$321.10 | | | |
| Networking Planning & Facilitation Training space | 20 | 10 | | | \$1,094.80 \$ 300.00 | \$1,094.80 | \$ 300.00 | | |
| Food for Participants Final Report Total Cost Task 3 | 25 60 | 15 25 | 0 | 0 | \$450.00 \$1,481.65 \$3,808.10 | \$1,481.65 \$3,058.10 | \$450.00 | | |
| Total | | | | | Fort Collins Utilites Percentage Match | \$8,402.65 | \$ 14,540.00 | | |



 Guide for facility managers and building maintenance professionals to increase water efficiency through self-audits

Appendix B Firm Overview and Qualifications

Maddaus Water Management is a woman-owned business, incorporated in January 2013, that was originally founded by William Maddaus in 1995. The firm has five employees and has completed over 370 projects in 21 years. The firm operates from its offices in Danville, California and Folsom, California.

MWM gives clients the personal attention expected of a small business. As registered engineers, MWM has always taken a technically rigorous approach to water management planning using proven engineering estimates of water savings and cost-effectiveness analysis, including detailed financial analysis of utility costs and benefits. The company is widely recognized for its expertise and capabilities in water resources management, drought, water auditing, and water conservation planning evaluations.

William Maddaus and Lisa Maddaus were original authors of the first edition of the American Water Works Association (AWWA), Manual of Practice, M52, Water Conservation Programs – A *Planning Manual* (AWWA, 2006). The manual is peer-reviewed and accepted by AWWA. It is currently being updated by MWM and reviewed and commented on by AWWA members. In November 2013, Maddaus Water Management also completed a new publication for the International Water Association, *Preparing Urban Water Use Efficiency Plans – A Best Practices*



Guide (IWA, 2013).

Michelle Maddaus, P.E., is a registered civil engineer in California with 18 years of experience, a wide variety of which is in the water resources field. Michelle has been Project Manager for dozens of water conservation plans since 2003. Some of the California plans completed in the past few years include East Bay Municipal Utility District, Marin Municipal Water District (MMWD), Sonoma County Water Agency (9 individual water agencies), City of Oceanside, City of Santa Barbara, and Bay Area Water Supply and Conservation Agency (BAWSCA) representing 26 water agencies.

Michelle has been working with urban water management plans since 2000, including the City of Sacramento (2000), Calistoga (2005), Suisun-Solano Water Authority (2005, 2010, 2016), South Tahoe Public Utilities (2010), Liberty Utilities (2016), Mid-Peninsula Water District (2016), City of Sonoma (2016) and the technical demand analysis portion of the UWMPs for over 57 agencies, like Marin Municipal Water District, North Marin County Water District, City of Santa Rosa, City of Petaluma, City of Rohnert Park, City of Windsor, City of Sonoma, Valley of the Moon, City of Cotati. She also produced a Water Conservation and Implementation Plan for San Luis Obispo County's Los Osos Service Area.

Michelle is comfortable designing both indoor and outdoor conservation programs with current technology. She has conducted over 300 CII audits and has directly witnessed equipment and program needs of the water customers, including the survey for facilities in California, Washington, and Hawaii. Her water audit experience includes facilities in Sonoma County, City of Burlingame, University of California Santa Cruz,





Stanford Linear Accelerator, and Stanford University Campus. Michelle is also an excellent trainer who has done in-person trainings for over 200 people on the DSS Model and for over 400 people regarding how to conduct a CII water efficiency survey.

Michelle is affiliated with the American Water Works Association (AWWA) and is a past chair of the Climate Change Committee, which she helped launch in 2008 and now has over 100 members nationwide. In March 2012, Michelle won the OASIS award from AWWA for her leadership for the Climate Change committee. In June 2012, she was featured on the cover of the AWWA Opflow magazine. The Opflow article, written by the MWM Team, focused on including water conservation in the portfolio of future water options for utilities to allow sustainable water management. In 2013, she co-authored *Preparing Urban Water Efficiency Plans – A Best Practice Guide* published by the International Water Association. She led the MWM team in updating AWWA's *Manual of Water Supply Practices, M52, Water Conservation Programs – A Planning Manual* in 2014-2016. The manual is due to be published in late 2017. Michelle has a B.S. in Civil and Environmental Engineering and an M.B.A. from UC Davis.

Firm Experience

MWM has conducted numerous commercial water audits, as well as fifteen (15) hands-on field and PowerPoint based CII audit trainings over the past five years (2012-2017). Below is a sampling of these trainings (references for trainings are available upon request):

- City of Santa Barbara (7-day field training marina, laundry facility, hotels, retirement community)
- Army Corps of Engineers (4-day field training army base) – 10 attendees
- Honolulu Board of Water Supply (2-day field training large hotel) – 24 attendees representing all the Hawaiian Islands
- Abbotsford, Canada (3-day field training poultry processing/agriculture)
- Cambria Services District (4-day field training restaurant, hotels)
- San Luis Obispo County (2-day field training grocery stores, golf course, hotel resort)
- Stanford University (6 days in the field, over 3 trips turf and landscape areas)
- State of Illinois Community Colleges, hosted by Lewis and Clark Community College (2-day field training – cooling tower, laboratory, pool, kitchens, restrooms)
- Pacific Gas and Electric (6 separate 1-day classes) small and medium business training for over 200 attendees given in San Francisco, Stockton, Chico, and San Jose, CA – most recent class was held on May 15, 2017
- Monterey Peninsula Water District/California American Water (3 full days of training at conference center) – over 25 attendees
- Peer to Peer Conference Training (half-day training hotel in San Francisco, CA) – 14 attendees
- San Jose Water (5 full days of training 9 cooling towers, tower-only audit at large Silicon Valley plant,



Army Corps of Engineers



Illinois Community Colleges/Lewis & Clark



school, large church complex, concert hall, City of San Jose Convention Center) – 3 attendees

 City of Santa Barbara and Carpinteria (3-day field training – hotels, brewery, high technology silicone adhesive manufacturer, large private boarding school campus) – 5 attendees

Maddaus Water Management CII Training References:

Attended training in 2013 and 2017 for Santa Barbara and Carpentaria Cathie Pare Water Resources Specialist City of Santa Barbara, Public Works 805-564-5593 CPare@SantaBarbaraCA.gov

Attended Large Training in Monterey for 20+ and trained his staff of 3 in 2017 Kurt Elvert Water Conservation Supervisor San Jose Water Company 1221B South Bascom Ave. San Jose, CA 95128 <u>kurt.elvert@sjwater.com</u> 408-918-7264

6 large water audit trainings of 15 – 40 attendees Ryan Stroupe PG&E Pacific Energy Center 851 Howard Street San Francisco, CA 94103 415-973-7257 r2s2@pge.com

Hosted large 3 day training of 20+ people Joe DiMaggio Operations Supervisor - Conservation 511 Forest Lodge Road Suite 100 Pacific Grove, CA 93950 Office 831-646-3228 Fax 831-375-4367 Cell 831-236-7544 joe.dimaggio@amwater.com



Honolulu Board of Water Supply