



EFFECTIVE UTILITY MANAGEMENT IN ACTION

UTILITY CASE EXAMPLES

Murfreesboro Water Resources Department
Columbus Water Works
Lehigh County Authority
Scottsdale Water
Boston Water and Sewer Commission

August 2018



CONTENTS

Introduction.....	1
Key Elements of EUM.....	3
Murfreesboro Water Resources Department.....	4
Columbus Water Works.....	9
Lehigh County Authority.....	16
Scottsdale Water.....	21
Boston Water and Sewer Commission.....	27

The Effective Utility Management Collaborating Organizations



Introduction

Effective Utility Management (EUM) first made its way onto the national scene in 2008 with the release of the original *Effective Utility Management: A Primer for Water and Wastewater Utilities* (“EUM Primer”). A compilation of case examples that demonstrated how a set of five pilot utilities had utilized EUM was released the following year.

Since the *EUM Primer’s* 2008 release, EUM has grown to be one of the most widely used management frameworks for water and wastewater utilities across the United States. It is a regular topic at utility conference sessions, it is used as a framework for several national utility award programs, and it is used in the everyday operations and management at water utilities of all sizes around the country.

In 2017, the eleven EUM Collaborating Organizations released an updated version of the *EUM Primer*, revised to reflect the evolving technologies, challenges, and operating contexts faced by utility leaders today. The case examples included in this document demonstrate a range of strategies and techniques that today’s utility leaders are using to implement EUM in their everyday work.

The purpose of this case example compilation is to inform utilities about how their peer water service providers have integrated EUM into their day-to-day operations and future planning initiatives.

The Collaborating Organizations would like to thank the following individuals for their contributions to the five case examples highlighted in this compilation:

Boston Water and Sewer Commission
John Sullivan and Mark Van Dam

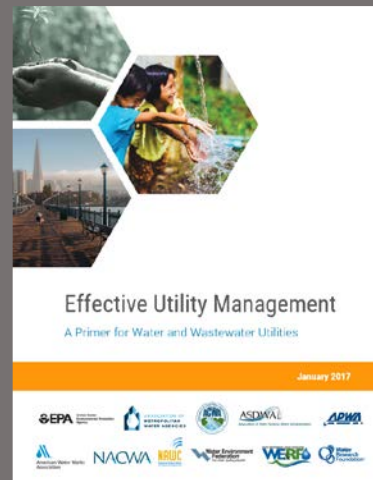
Columbus Water Works
Becky Butts, John Peebles, and Gwen Ruff

Lehigh County Authority
Liesel Gross

Murfreesboro Water Resources Department
Darren Gore and Steve Tate

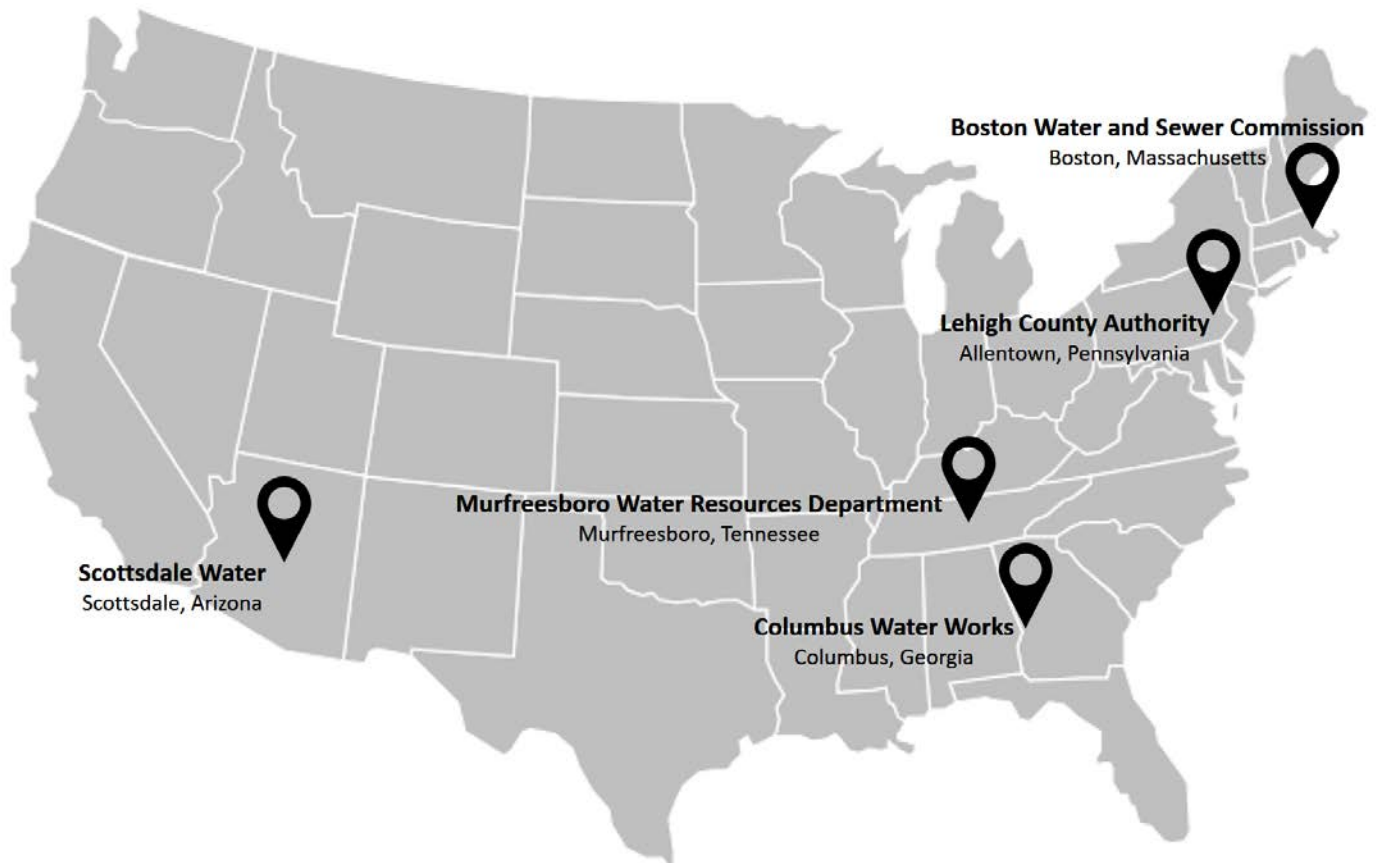
Scottsdale Water
Brian Biesemeyer

Effective Utility Management: A Primer for Water and Wastewater Utilities



The *EUM Primer* is the “go to” document for the Effective Utility Management initiative. The *Primer* describes the critical elements of EUM, including the Ten Attributes and the Five Keys to Management Success, and features a utility Self-Assessment exercise.

FEATURED CASE EXAMPLES



UTILITY QUICK STATS

Name	Location	Type	Size
Murfreesboro Water Resources Department	Murfreesboro, Tennessee	Combined	Water: 20 MGD Wastewater: 24 MGD
Columbus Water Works	Columbus, Georgia	Combined	Water: 98 MGD Wastewater: 80 MGD
Lehigh County Authority	Allentown, Pennsylvania	Combined	Water: 42 MGD Wastewater: 40 MGD
Scottsdale Water	Scottsdale, Arizona	Combined	Water: 100 MGD Wastewater: 40 MGD
Boston Water and Sewer Commission	Boston, Massachusetts	Combined	Water: 150 MGD Wastewater: 90 MGD

Key:

Combined: Drinking Water and Wastewater Utility | MGD: Million Gallons per Day

Key Elements of EUM

Throughout the case examples featured in this document, several key elements of Effective Utility Management are referenced. These elements are described below, and are featured prominently in *Effective Utility Management: A Primer for Water and Wastewater Utilities (EUM Primer)*.

Throughout the *EUM Primer*, utilities learn about the Ten Attributes and Five Keys, and how these important elements work in tandem to support successful utilities in today’s challenging operating contexts.

Ten Attributes of an Effectively Managed Utility

The Ten Attributes provide a clear set of reference points and are intended to help utilities maintain a balanced focus on all important operational areas rather than reactively moving from one problem to the next. The Ten Attributes are listed, in no particular order, in the white inner ring of the graphic (right).

Five Keys to Management Success

The Five Keys are proven approaches which help utilities to maximize their resources and improve performance. By embedding the Five Keys into their workplace culture, utilities create a robust foundation for strong, ongoing performance in the Ten Attribute areas. The Five Keys are listed, in no particular order, in the blue outer ring of the graphic (right).



The Effective Utility Management “Self-Assessment”

The rigorous and systematic self-assessment tool featured in the *EUM Primer* helps utility managers and staff evaluate their operations and identify where to begin improvement efforts. By assessing how a utility performs relative to the Ten Attributes, utility leaders can gain a more balanced and comprehensive picture of their organization.

Murfreesboro Water Resources Department

Murfreesboro Water Resources Department (MWRD) is committed to servicing Murfreesboro, Tennessee residents, businesses, and visitors by providing high-quality drinking water, advanced wastewater treatment and water reclamation, and stormwater management.

In adopting the concepts and tools of Effective Utility Management, MWRD used the Ten Attributes of an Effectively Managed Utility as a framework for setting future performance goals and management strategies. Every initiative, every action, every decision, and every dollar expended is now explicitly targeted at achieving one or more of these goals for the express benefit of the community.



MWRD's EUM Implementation at a Glance

System Profile



Murfreesboro, TN
Southeastern U.S.



Combined Water + Wastewater
Municipal Department



Overseen by a seven-member Board,
which makes recommendations to City
Council



Water Supply: East Fork Stones River and Percy
Priest Reservoir
Receiving Stream: W. Fork Stones River



Last WTP Expansion 2010
Last WWTP Expansion Fall 2017



	Water	Wastewater
Customers Served	78,000	130,000
Lines	442 mi.	646 mi.
Plant Capacity	20 MGD	24 MGD



EUM sets clear expectations for everyone in the Department. The message of improving performance through a 'Measure to Manage' structure creates focus and a collaborative team environment that builds momentum and nurtures a change-ready mindset.

– Darren Gore, Director

MWRD was looking toward a year of significant change in 2012, with planned retirements driving a change in leadership at the utility. After learning about the Effective Utility Management initiative through a series of conference sessions, MWRD's new leadership team and City Council decided to adopt the EUM Ten Attributes as a framework for focusing management and operational strategies at the utility.

The leadership team chose EUM because of its clear and comprehensive nature; it could act as a tool by which to communicate the utility's activities, accomplishments, and investment needs more clearly with the governing Board and City Council.

Darren Gore, MWRD’s Director, held a day-long meeting in 2012 dedicated to educating the Murfreesboro Water Resources Board about EUM. Following the meeting, MWRD conducted the Utility Self-Assessment to identify priority Attributes with input from division managers, board members, and the City Manager’s office. Gore also advocated for the creation of an “EUM Coordinator” position to improve business intelligence, utilize data more effectively, develop Key Performance Indicators (KPIs), provide quality assurance, and ensure coherence of MWRD’s EUM activities and programs. Since hiring the EUM Coordinator in 2013, MWRD has implemented a number of processes and activities related to EUM, including participating in the American Water Works Association Utility Benchmarking Survey, and being recognized in 2016 through the Utility of the Future Today Recognition Program.

2011	2012	2013	2014	2016
<p>Learns about EUM Primer concepts and tools at a series of EUM-based conference sessions.</p> 	<p>Presents EUM model to City Council.</p> <p>Completes self-assessment and identifies top three EUM priority attributes: Product Quality Financial Viability Customer Satisfaction.</p>	<p>Creates a position for an EUM Coordinator.</p> <p>Develops Information Technology Master Plan to replace CIS and implement AMI.</p> <p>Initiates data trending of key performance indicators (KPIs).</p>	<p>Initiates Annual Trends and Strategic Plan (updated annually).</p> <p>Participates annually in AWWA Utility Benchmarking Study.</p> <p>Identifies KPIs with substandard performance vs peer group.</p>	<p>Receives “Utility of the Future: Today” Recognition.</p> 

The Utility Self-Assessment

The Self-Assessment was conducted by the MWRD Leadership Team (Division Managers), the Water Resources Board, and the Murfreesboro City Manager’s Office. Across these respondents, Customer Satisfaction, Product Quality, and **Financial Viability** were identified as MWRD’s highest priority Attributes. The exercise also produced a prioritized list of EUM Attributes in need of the most improvement. Financial Viability and Product Quality were consistently rated highly in both importance and achievement, while both **Customer Satisfaction** and **Employee and Leadership Development** were identified as areas for improvement. Since 2013, improvement initiatives have largely focused on the Customer Satisfaction Attribute. The development of a strategic plan related to Employee and Leadership Development is also underway, as of 2017.

Keys to Management Success: The MWRD Approach

The EUM Keys to Management Success listed below are explicitly linked to the tools and approaches that MWRD utilizes to plan for the future, address issues proactively, and track performance continuously, all the while communicating successes and needs with their governing body, the Water Resources Board.

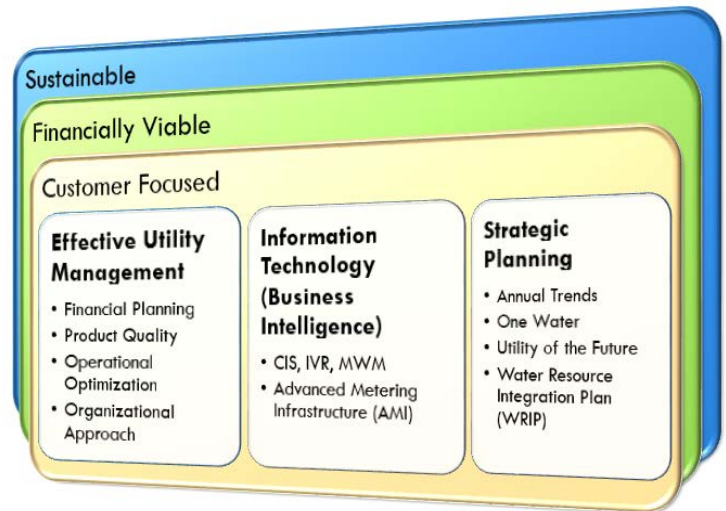
Key	MWRD Approach
Measurement	<ul style="list-style-type: none"> Select KPIs Benchmark performance Track data and trends
Knowledge Management	<ul style="list-style-type: none"> Enhance data connectivity & communication Promote teamwork to increase knowledge base Plan for succession and turnover
Strategic Business Planning	<ul style="list-style-type: none"> Define annual objectives Relate objectives to budgets and five-year capital improvement plan
Continual Improvement Management	<ul style="list-style-type: none"> Repeat processes Modify KPIs as needed Analyze trends and adjust as needed
Leadership	<ul style="list-style-type: none"> Ongoing management commitment to EUM Share successes and illuminate challenges



MWRD utilized this graphic depiction to show its Board and staff how each strategic element, implicitly related to the Keys to Management Success, are connected through a "sustainability to affordability" approach.

Activities and Process Improvements

In 2013, MWRD began a number of initiatives related to Customer Satisfaction, many of which corresponded with the utility's Information Technology (IT) Master Plan and its focus on utilizing technology and process improvements to optimize efficiency and improve the customer experience. The organization has since replaced a legacy customer information system, begun accepting credit cards, introduced e-billing and installed Interactive Voice Response (IVR), giving customers easier access to account information and the ability to pay their bills remotely.



MWRD put together the above graphic to illustrate how each activity, process, and technology implemented are cohesive within the broader objectives: to continue to be sustainable, affordable, and customer-focused.

Additionally, MWRD began use of the Mobile Workforce Management software which issues and tracks electronic service orders to field technicians, and installed Advanced Metering Infrastructure (AMI) which provides more accurate metering, early leak notification to customers, and online customer access to their own water consumption data.

Achieving Real Results

In addition to its more substantial EUM improvement initiatives and projects, MWRD achieved a number of “quick wins” shortly after adopting the EUM Ten Attributes framework.

By sharing these successes with their Board and reiterating the connection with EUM objectives, MWRD has garnered significant buy-in and trust from their Board and created momentum to continue advancing process improvements and activities related to its EUM-based strategic goals. Also included are examples of graphics that MWRD has presented to its Board in 2016 and 2017 to demonstrate the results of a few of the initiatives described below.

The value of EUM is in its capacity to organize, communicate, and manage the mission in terms that everyone - staff, customers, and governing bodies - can embrace.

- Steve Tate, MWRD EUM Coordinator

Employee Engagement Committee: The Operations and Maintenance division created an Employee Engagement Committee to break down existing organizational silos and encourage employees to share innovative ideas, contributing to the **Employee and Leadership Development** Attribute area.

Measuring Success: MWRD developed a Strategic Plan and, by developing indicators and measures as a part of this plan, began participating in the annual American Water Works Association (AWWA) Benchmarking Performance Survey.

Conserving Energy and Protecting Ecosystem Health: The Wastewater Treatment Plant, already engaged in stormwater runoff enhancements and Wastewater Treatment Plant improvements prior to 2013, also began engaging in energy conservation work related to microbiological processes and nutrient removal, thereby contributing to the **Product Quality** attribute. Measurable improvements in water quality and the biological health of the receiving stream have led to approval of a renewed and expanded NPDES permit, and delisting of one and possibly two receiving stream segments from the 303(d) “Impaired Waters” list.

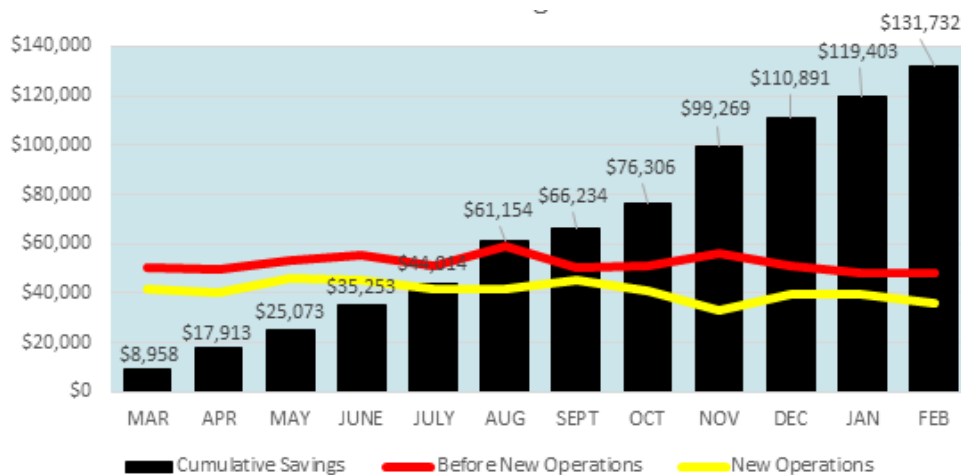


Figure 1 Annual Electrical Savings for Carousels

Murfreesboro’s energy savings initiatives include a nutrient removal process that lowers speeds in the carousel aerators. This chart tracks the annual cost savings from this practice (cost savings in this chart are specifically for FY14).

Murfreesboro Water Resources Department Leadership Team



Since the Department adopted EUM, the Board feels much more connected with why certain decisions, initiatives and recommendations are brought forward by staff. EUM lets us know that staff is concentrating on all aspects of the utility and assures the Board that priority [Attributes] are at the forefront.

– John Sant Amour, Jr., Water Resources Board Chairman

Lessons Learned

The application of EUM tools and concepts has been critical to developing a cohesive, strategic vision at MWRD. Prior to EUM, there was no formal strategic plan or continual improvement process in place. EUM helped MWRD move beyond a general understanding of its priorities and needs to a more cohesive vision that tied all core missions into one Strategic Plan. This plan also helps MWRD's stakeholders understand the connection between activities, investments, and long-term objectives.

Concepts within the *EUM Primer* lay the groundwork for helping MWRD to advance its operations and management approaches, keeping up with today's most current technologies and practices. EUM shifted operations and management at MWRD toward a Utility of the Future mindset through applicable tools and an actionable framework. Through EUM, Darren Gore says, "We went from descriptive to predictive metrics and started seeking more regional, integrated, least-cost, highest return solutions. Facilitating collaboration with key stakeholders was also paramount to achieving long-term, sustainable results."

EUM honed MWRD's focus on our performance. In essence, EUM shifted MWRD into the paradigms required of a Utility of the Future.

– Darren Gore, Director

EUM allows a clear pathway to take a leader's vision and communicate it to staff, governing bodies, and other stakeholders. By sharing successes and planning next steps through the EUM lens, MWRD has developed a cohesive strategy and is able to frame individual initiatives within the context of broader goals. MWRD has intentionally focused on communicating with its governing body and other stakeholders to ensure that there is a clear understanding of the connection between today's initiatives and tomorrow's outcomes. Both MWRD leadership and the Board have noted how helpful this communication has been to building understanding, trust, and momentum over the five years since the utility first adopted EUM.

Columbus Water Works

Columbus Water Works (CWW) has a vision: to be an outstanding provider of utility services, dedicated to protecting the environment, aspiring to new opportunities and compelled to excel in service to its community.

CWW has been recognized as a leader in its field for its work to make that vision a reality. In 2009, CWW was featured in a case study for its application of the tools and concepts from *Effective Utility Management: A Primer for Water and Wastewater Utilities* (the EUM 'Primer'), based on the original version of the EUM Primer, which was released in 2008. Since then, CWW has continued to utilize EUM as a strategic planning framework, and has been recognized on the national stage for its EUM-related efforts, including recognition as a "Utility of the Future Today" through the joint recognition program by NACWA, WaterReuse, WEF, WE&RF, and the U.S. EPA. This follow-up to the 2009 case example describes how CWW has continued its EUM journey.



System Profile



Columbus, GA
Southeastern U.S.



Chattahoochee River



Combined Water + Wastewater
Enterprise Utility



Combined Sewer Overflow (CSO) Treatment
Capacity (CWW operates two CSO plants): 121 MGD



Five-member board includes the mayor
and four seats appointed by the
Columbus City Council.



	Water	Wastewater
Customers Served	65,847	60,295
Lines	1405 mi.	1187 mi.
Plant Capacity	98 MGD	80 MGD

A Decade of EUM at Columbus Water Works

Columbus Water Works instituted its first comprehensive strategic plan in 1997. The plan was revised in 2005 and reviewed again in 2007. Billy Turner, former Executive Director and an industry leader through his work with the Water Environment Federation and the National Association of Clean Water Agencies, contributed substantially to the formulation of the original EUM framework through his work on the steering committee that oversaw its development. Following Turner's participation on the inaugural EUM Steering Group, CWW undertook a second major review of the strategic plan in 2008, this time using the *EUM Primer* and Self-Assessment exercise to evaluate organization-wide performance. As part of this review, Columbus used EUM as the framework for a day-long strategic planning workshop. In preparation, managers and team leaders completed the Self-Assessment exercise, the results of which were presented at the workshop.

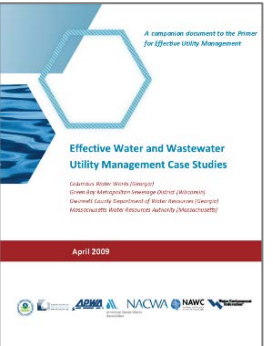


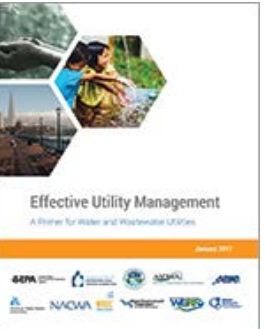
In addition to assessing its goals and performance relative to the Attributes, CWW also cross-checked the list of example measures provided in the *EUM Primer* with its existing performance measures and found that CWW's performance measurement system was highly developed and provided strong coverage. Similarly, CWW compared its existing management approach with the Five Keys to Management Success and found a high degree of correlation, proving a useful exercise to verify that it was on track with its management approach.

CWW earned the Association of Metropolitan Water Agencies' (AMWA) 2008 Platinum Award for Utility Excellence, which is structured around the Attributes and Keys. CWW was also featured in 2009 as one of the first four utility case examples created by the Collaborating Organizations to demonstrate how utilities were beginning to apply EUM in their everyday operations and management.

Since 2008, CWW has established EUM as the framework for all of its strategic planning activities, with strategic plan updates made using the EUM framework in 2012, 2015, and one planned for late 2017. It has been recognized on the national stage several times, receiving Platinum Awards from both the National Association of Clean Water Agencies (NACWA) and AMWA.



Members of the CWW leadership team at a 2015 Strategic Planning Orientation.

2008	2009	2011-2015	2016	2017
<p>Learns about EUM through a conference session.</p> <p>Begins utilizing EUM to update existing strategic plans.</p> <p>Wins first AMWA Platinum Award.</p>	<p>Featured as a utility case example for EUM implementation.</p> 	<p>Conducts two EUM-based strategic plan updates in 2012 and 2015.</p> <p>Wins NACWA Platinum Awards in 2011 and 2012 based on EUM initiatives.</p> 	<p>Wins second AMWA Platinum Award for excellence relative to the EUM Ten Attributes.</p> 	<p>Third EUM-based strategic plan update scheduled for late 2017.</p> 

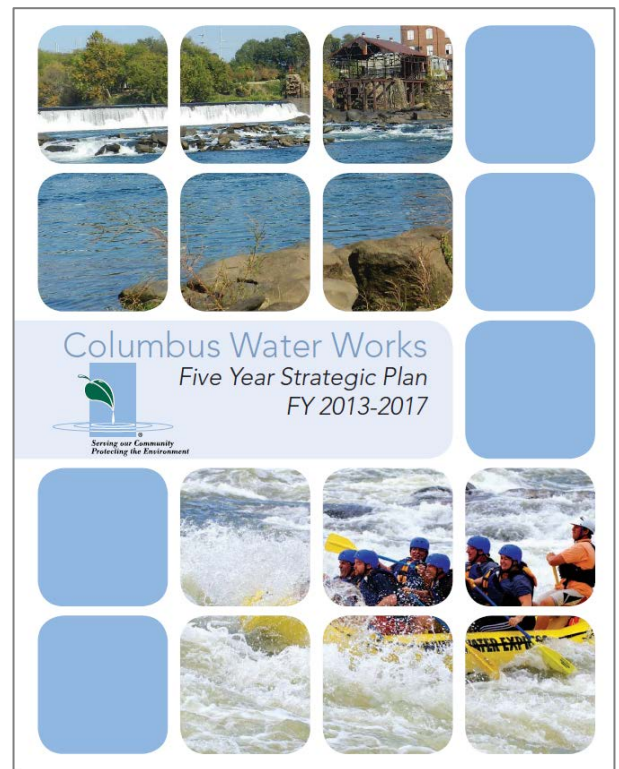
EUM-Driven Strategic Initiatives

Based on their initial EUM Self-Assessment findings and stakeholder input, CWW staff and leadership developed six Strategic Initiatives to help focus internal resources and programs toward the areas that matter the most for the organization. The Strategic Initiatives directly relate to EUM Attributes (see graphic at right for an explanation of how they align), and also take into account key community values. These are:

- Enhance Customer Satisfaction
- Strengthen Regional Partnerships
- Leverage Information Technology
- Optimize Infrastructure Performance
- Develop Sustainable Workforce
- Maintain Financial Stability

Each of CWW’s six Strategic Initiatives has a dedicated team made up of members from across the organization. Team members meet regularly to plan for and advance projects related to that Initiative’s “Performance Work Plan.” Performance Work Plans are maintained for each Strategic Initiative, and include a list of programs and projects that are either planned or underway for the Strategic Initiative.

Strategic Initiative Teams regularly report to the CWW Board on progress relative to each Initiative, performance metrics have been established for each Initiative, and the Initiatives are also the framework for CWW’s Five-Year Strategic Plan.



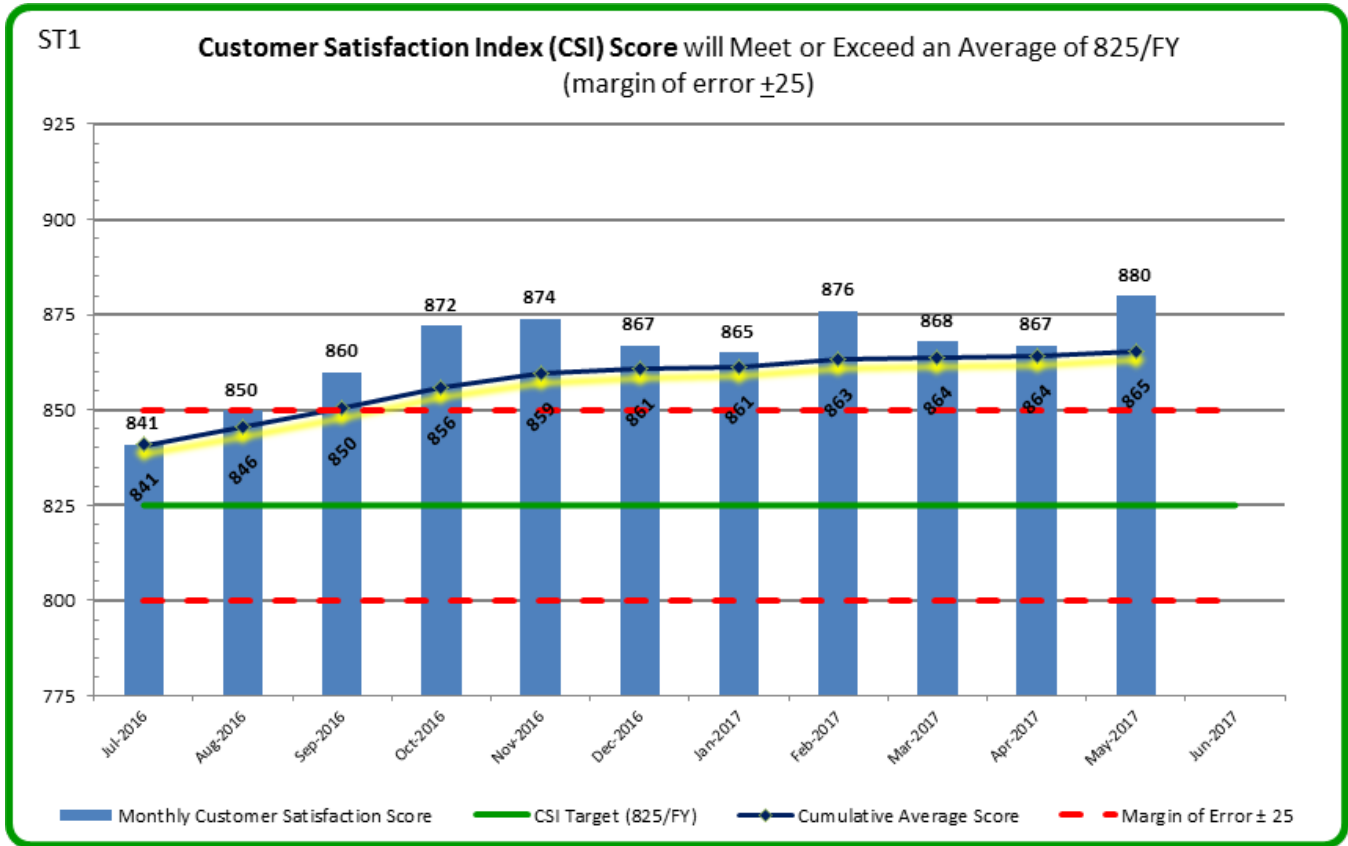
Keys to Management Success: The CWW Approach

The EUM Five Keys to Management Success are frequently used management approaches and systems, which create a supportive context for a utility as it works towards its desired outcomes across the Ten Attributes. CWW has implemented the Five Keys both implicitly and explicitly throughout their day-to-day operations and long-term planning processes.

Measurement: Tracking Progress against the CWW Strategic Initiatives

Two critical factors in CWW’s success in implementing EUM are measuring progress relative to each Strategic Initiative, and gathering input from the customers that it serves across the Columbus, Georgia community. Both of these practices help CWW to engage in a cycle of continual improvement, an important Key to Management Success. Strategic business planning, another important Key, is embedded deeply throughout the CWW culture in its ongoing work relative to the Strategic Initiatives described above.

For each of CWW’s six Strategic Initiatives, the CWW team has developed a set of measures (benchmarks) that it uses to track progress. In total, CWW tracks 30 benchmarks which are updated yearly depending on emerging priorities and new data availability. Below are examples of visual representations that CWW utilizes for one of its performance measures, the Customer Satisfaction Index (CSI). The CSI is based on a monthly Customer Satisfaction Survey, which CWW contracts through an external consultant as a part of its Strategy Team #1, Enhance Customer Satisfaction. The survey results are used to calculate an overall satisfaction score that is included in CWW’s monthly benchmark reporting. A clip of CWW’s master benchmark spreadsheet, which is completed monthly, is also included below.



Team	Benchmark Description	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY
1	Total Number of Water Quality Complaints will not Exceed 160/FY (cumulative)	✓	✓	✓	✓	✓	✓	✓	✗	✗	✗	
1	Customer Satisfaction Index (CSI) Score will Meet or Exceed an Average of 825/FY (margin of error ±25)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
1	Achieve or Exceed 50% of Customer Payments Electronically/FY (YTD average)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	

In addition to internal measurement and benchmarking, CWW began to participate in the American Water Works Association (AWWA) Annual Benchmarking Survey as a supplementary method of tracking the utility’s performance relative to the Attributes and a wide range of industry-accepted indicators.

Continual Improvement: Making Adjustments Based on Community Input

As a part of its strategic planning and continual improvement efforts, CWW has committed to regular engagement and feedback collection from its customers and other stakeholders. In addition to traditional customer feedback mechanisms (e.g., customer service phone numbers, complaint collection/tracking), CWW has conducted regular stakeholder surveys since 2010, soliciting feedback on a range of topics related to its operations, customer service practices, and future strategies/goals. CWW uses the results of these surveys to update and adjust its practices based on the evolving needs and priorities of the community and to ensure that its Strategic Initiatives continue to align with community values.

THE CWW DOOR HANGER PROGRAM: A DIRECT RESPONSE TO CUSTOMER FEEDBACK

Columbus Water Works
Serving our Community
Protecting the Environment

To Our Valued Customer

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO. 14 COLUMBUS, GA

POSTAGE WILL BE PAID BY ADDRESSEE

CUSTOMER SATISFACTION SURVEY
PO BOX 1599, GA 31902-1599
COLUMBUS, GA 31902-1599

Top portion to be filled out by CWW representative

Working To Serve You Better
While you were out, we performed the following service:

- Unstopped sewer line/serviced or repaired sewer main
- Connect water
- Repaired water main/service
- Water meter repair work/or meter change
- Other

The CWW representative for this job was: _____

Date: _____ Truck # _____
If you have any questions please feel free to Call us at 706-649-3400.

VALUED CUSTOMER: Please fill out the following:
Truck # _____ 8172

We need your help!
Please take a moment and let us know what kind of service we provided. We would like to know if we met your expectations.

	Satisfactory	Unsatisfactory
Response time	<input type="checkbox"/>	<input type="checkbox"/>
Competence	<input type="checkbox"/>	<input type="checkbox"/>
Courtesy	<input type="checkbox"/>	<input type="checkbox"/>
Quality of work	<input type="checkbox"/>	<input type="checkbox"/>

Address: _____

Comments: _____

Bottom portion to be filled out by CWW representative

CWW Representative: _____

Date: _____ Truck # _____

Service Location: _____

8172

The Door Hanger Program, an initiative of Strategy Team #1 (Enhance Customer Satisfaction) was developed as a way to capture feedback from customers as a result of a specific service call to a residential address. In the Customer Service Index Survey, customers indicated that they wanted to know when a CWW employee performed a service at their residence, and the CWW Door Hanger Program was created in response.

The door hangers left following a service visit include a CWW return-addressed, postage stamped survey card, which the customer may complete and mail to CWW. Customers also have the option to complete this survey online through CWW's website. Participating departments at CWW are Meter Maintenance, Field Services, and Water Quality Monitoring.

Customer Service and Meter Maintenance monitor this activity. A designated member of Meter Maintenance maintains the files for all door hangers placed, as well as the comments returned to CWW. The customer service manager (or designated representative) reviews all comments to determine if further action is needed. If so, the comment card is forwarded to the appropriate department. A monthly departmental report is provided to Strategic Planning.

Building a Deeper Bench: Employee and Leadership Development as a Key Area of Focus



During CWW's initial EUM self-assessment in 2008, participants ranked Product Quality and Financial Viability as the most important Attributes for CWW; these Attributes also received the highest achievement ratings, meaning that CWW was doing well in the Attributes that were most important to the utility and its customers. Employee and Leadership Development also ranked as highly important for CWW, but rated lower in terms of achievement. To address this discrepancy, CWW immediately began developing an employee training program and a succession plan to address pending turn-over of the executive team.

Since 2008, Employee and Leadership Development has remained one of the most critical Attributes for CWW. The CWW leadership team believes that in order to be strong across all of the Attributes and CWW Strategic Initiatives, the organization must have a "deep bench" of strong employees who are committed to the utility and its mission for excellence. Some of the key practices and programs that CWW has developed around Employee and Leadership Development are described below.

EXTERNAL PARTNERSHIPS with learning/career development organizations, such as a partnership with the Columbus State University Leadership Institute, a leadership program that provides regular information to all employees, in addition to a classroom-based "How Deep is Your Bench?" training program that CWW employees and emerging leaders are able to attend. At the Executive level, CWW is also partnering with the Leadership Institute to review and redefine the utility's Strategic Plan, and to conduct a Community Leaders Survey, which was initiated in 2013.

Developing **CAREER LADDERS** within each department for employees who are interested in advancing within the organization. Career ladders include certification and continued learning opportunities.

Creating **SUCCESSION PLANS** to address pending retirements and to improve continuity in the event of a departure.

Focusing career/employee development initiatives on **"SOFT SKILLS"** (e.g., leadership and organizational culture development), beyond the traditional technical training that employees have always received.

Doing a **"STRENGTH FINDER"** activity to assess employee strengths and areas of greatest opportunity for growth. This exercise began with utility managers, but has since been made available at all levels of the organization.

As a manager, EUM has given me a framework that is accepted throughout the industry. Because of this, I know that if we are addressing these elements of an effectively managed utility, we have our eyes on the right ball.

– John Peebles, Senior Vice President, Division of Water Resource Operations

Eight Years Later: Lessons Learned

In the eight years since Columbus Water Works was an original EUM Case Example utility, the organization has continued its deep commitment to EUM as a holistic management and continual improvement framework. CWW has learned some important lessons along the way:

Effectively managing your utility is about planning for your future and refining your strategies. In addition to its core Strategic Plan and foundational Capital Improvement Plan, CWW has developed four complementary plans, listed below. Each of the plans generate a list of projects, which are prioritized through consideration of overall project cost, project risk level, triple bottom line benefits, and relation to CWW's EUM-based Strategic Initiatives.

Asset Management Program

Information Technology (IT) Master Plan

Facilities Master Plan

Energy Roadmap

To be successful in EUM, you have to have to have a deep bench of committed team members within the organization. By establishing teams and leaders for each Strategic Initiative, CWW has achieved buy-in from all levels of the organization for EUM and the associated strategies.

Broader community values must be an important consideration when defining a utility's priorities for the future. CWW has collected input from its community members at several points along the way in its EUM journey, helping to garner board and customer support for the initiative.

Lehigh County Authority

Lehigh County Authority (LCA) aims to deliver exceptional value through high-quality, affordable, and reliable water and wastewater services, meeting the needs of both existing and future customers.







Originally formed in 1966 to provide wholesale water to county municipalities, LCA has grown and adapted to meet the changing needs of the region. LCA's service area now includes fourteen different water systems in Lehigh and Northampton counties, each with their own source of water, storage facilities, and treatment systems. Building on a pre-existing Strategic Plan, LCA's recent adoption of the tools and concepts from *Effective Utility Management: A Primer for Water and Wastewater Utilities (the EUM Primer)* was a logical step as the Authority continuously strives to improve service to its surrounding communities.



The Path to EUM: LCA's Leadership Transition

In 2015, Lehigh County Authority updated its Mission Statement, Vision Statement, and Values. In doing so, it also identified seven "Goal Categories," under which LCA created 45 different Goal Statements. However, competing priorities and the sheer number of goals made tracking progress across the organization cumbersome and difficult.

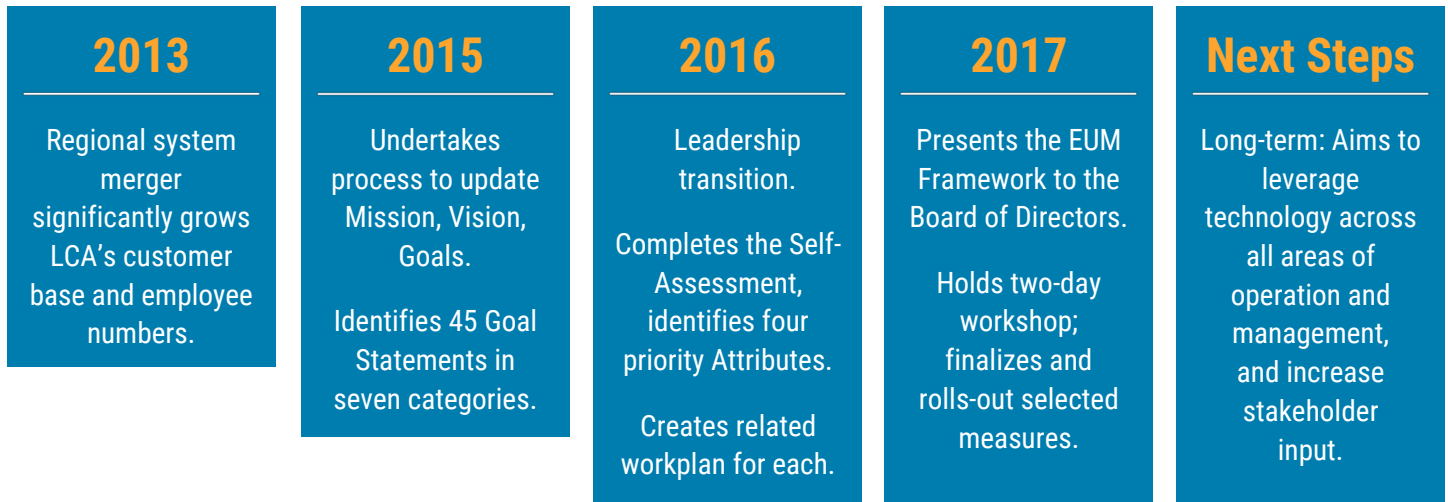
System Profile

 <p>Lehigh and Northampton Counties, PA Northeastern U.S.</p>	 <p>Schantz Spring Crystal Spring Little Lehigh Creek Groundwater wells</p>													
 <p>Combined Water + Wastewater Enterprise Utility</p>	 <p>Formed in 1966 Tripled customer base in 2013 via regional merger</p>													
 <p>Nine-member Board of Directors appointed by the county</p>		<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 60%;"></th> <th style="width: 20%; text-align: center; border-bottom: 1px solid #ccc;">Water</th> <th style="width: 20%; text-align: center; border-bottom: 1px solid #ccc;">Wastewater</th> </tr> </thead> <tbody> <tr> <td>Customers Served</td> <td colspan="2" style="text-align: center; border-top: 1px solid #ccc;">55,000</td> </tr> <tr> <td>Lines</td> <td style="text-align: center;">613 mi.</td> <td style="text-align: center;">325 mi.</td> </tr> <tr> <td>Plant Capacity</td> <td style="text-align: center;">42 MGD</td> <td style="text-align: center;">40 MGD</td> </tr> </tbody> </table>		Water	Wastewater	Customers Served	55,000		Lines	613 mi.	325 mi.	Plant Capacity	42 MGD	40 MGD
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2016 presented an opportunity to reevaluate and refocus the organization as LCA came under new leadership with a new CEO, CFO, and COO, as well as growth of the Board of Directors from seven to nine members. The new Board was interested in being more involved in the organization's goal-setting, and improving transparency and communication around measuring progress toward those goals.

In 2016, LCA's new CEO became aware of the *EUM Primer* through one of her member associations, American Water Works Association (AWWA). She recognized that the framework and approaches outlined in the *EUM Primer* could be utilized to strengthen LCA's operations and management, while addressing the requests of the Board. Implementing EUM helped the

utility set and prioritize goals, and communicate the process and achievements with staff, Board members, and external stakeholders.



The First Step: Conducting a Utility Self-Assessment at LCA

In November 2016, the LCA management team and select employees conducted the EUM Self-Assessment to gauge the organization's performance across the EUM Ten Attributes. The utility then calculated composite performance rankings based on the feedback provided by 100% of LCA managers and supervisors, and a number of staff. To identify priority Attributes, LCA adapted the EUM Self-Assessment slightly by creating a letter-based grading system to rate performance, rather than using the numerical system provided in the *EUM Primer*.

The summary table below shows the composite results of LCA's tailored self-assessment to grade performance and rank priority for the Ten Attributes. Yellow-shaded grades included more than one response with a "D" grade, and the green-shaded ranks indicated no significant difference in ranking among these Attributes.

EUM Attributes	Grade	Rank
Product Quality	A-	1
Financial Viability	C+	2
Infrastructure Stability	C	3
Employee and Leadership Development	C+	3
Operational Resiliency	B-	3
Water Resource Adequacy	B	3
Customer Satisfaction	B+	3
Operational Optimization	B-	8
Community Sustainability	B	9
Stakeholder Understanding and Support	B	10

Based on the aggregated responses to the Self-Assessment, the utility decided to focus on Attributes that ranked as the lowest performing, regardless of their priority ranking, and on the Attribute that scored highest in terms of priority, regardless of perceived performance. Through this process, LCA prioritized four Attributes as areas of focus in 2017: **Employee and Leadership Development, Financial Viability, Infrastructure Strategy and Performance, and Product Quality** (Note: The Attributes listed in the table to the left differ slightly in their titles from the Attributes listed here; the names of three Attributes were updated when the *Primer* was re-released in 2017).

The LCA Approach to the EUM Keys to Management Success

In addition to the EUM workshops and the Self-Assessment process, LCA leadership created a Mid-Term Visioning Worksheet (right) for employees to provide additional feedback on LCA's goals and organizational priorities. This feedback validated the Attributes that LCA selected as areas of focus through the Self-Assessment process, and helped to build internal buy-in and ownership around priority areas and goals.

In conjunction with validating the selected Attributes, the Visioning Worksheets highlighted the overarching priority areas of Information Technology, Communication, and Teamwork. These areas of interest outlined by staff generally support the Five Keys to Management Success, as described in the *EUM Primer*.

LCA views all initiatives as directly related to the Five Keys. For example, LCA created a new position of Chief Information and Innovation Officer as a result of its EUM implementation process. This position focuses on networks, storage, security, and continual improvement. It explicitly links information technology to the Attribute improvement areas, including addressing knowledge management and transfer needs associated with Employee and Leadership Development.

LCA 2020 – Mid-Term Visioning Worksheet – Employee Input

LCA Vision: *To be an industry-leading provider of world-class water services, today and tomorrow.*

1. **Your Name & Department** (optional, but please consider giving your name so we can follow up with you on your ideas!)
2. **What does this vision statement mean to you?** In other words, what does it mean to provide "world-class" water / sewer services? What would LCA look like if we achieved this vision?
3. **What should LCA focus on within the next three years**, in addition to our 2017 Goals, to move us closer to our vision?
4. **What is LCA's number one....**

Strength?

Weakness?

Opportunity?

Threat?

5. **How do you see yourself personally contributing to helping LCA achieve our vision within the next three years?**
6. **What training, tools or other resources / support would you need to be more effective in helping us achieve LCA's vision within the next three years?**

Measuring and Communicating LCA's EUM Processes and Achievements

In February 2017, LCA's leadership presented the EUM framework and the results of its internal assessment to its Board. LCA saw this presentation as an opportunity to communicate how the utility had identified these areas of focus, receive feedback, and address the Board's request for improved communication and transparency in management initiatives. The Board agreed that LCA selected the appropriate priority Attributes through the EUM Self-Assessment process, and raised additional Attribute areas that could be important to achieve long-term objectives (e.g., Stakeholder Engagement, Water Resource Sustainability).

When LCA leadership presented the EUM framework to the Board in February 2017, the utility also identified several possible measures for each priority Attribute. These measures were selected and adapted from the measures presented in Appendix C of the *EUM Primer*, and from AWWA's Performance Benchmarking resources.

After receiving approval from the Board, paring down the list of identified measures to select final measures proved challenging for LCA. For example, in some cases, the organization did not have the necessary data readily available. To address this difficulty, and other related measurement issues, LCA held a two-day workshop in May 2017 with an external expert to facilitate the process. During the workshop, LCA leadership, managers and employees considered availability of data, maturity of related programming, and communication and measurement goals, in order to select the measures outlined in the table below. LCA presented these measures to the Board for feedback and approval, and officially adopted them in July 2017.

LCA's Priority EUM Attributes	LCA's Selected EUM Measures
Financial Viability	<ul style="list-style-type: none"> • Debt Service Coverage Ratio • Internal vs. External Funding for Capital Expenditure
Infrastructure Strategy and Performance	<ul style="list-style-type: none"> • Asset Condition Assessment Coverage • Planned Maintenance Ratio • Asset "Needs Addressed" Coverage
Product Quality	<ul style="list-style-type: none"> • Elimination of SSOs / EPA CWA compliance • Small Water Systems - Disruption of Service • Small Water Systems - Regulatory Compliance • Small Wastewater Systems - Regulatory Compliance
Employee & Leadership Development	<ul style="list-style-type: none"> • Training & Knowledge Management Coverage • Training Hours per Employee

Planning for Success: Attribute Work Plans

In response to its Self-Assessment results, LCA identified an individual champion and team responsible for each priority Attribute. These teams established 2017 work plans with goals linked to quarterly milestones, descriptions of ongoing improvement activities, and plans for 2018 and beyond. LCA aims to develop a longer-term vision for each Attribute and expects the individual work plans to evolve into a Strategic Plan structured around the Attributes. LCA's overarching long-term aim is to leverage technology across all areas of management and operations, increase stakeholder input, and strengthen a culture of continual improvement. The following list provides an overview of the major objectives outlined within the 2017 LCA Attribute work plans.

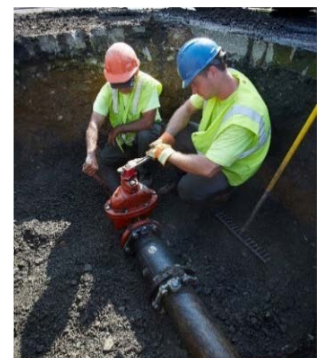


EMPLOYEE AND LEADERSHIP DEVELOPMENT: In 2017, LCA focused on succession planning and knowledge loss prevention. LCA identified, planned for, and addressed retirement-related staff turnover challenges, recruitment and retention strategies, and leadership development and capacity building for new and existing employees.

FINANCIAL VIABILITY: LCA's 2017 Financial Viability goals included achieving LCA 2017 budget specified performance targets, completing new capital need borrowing, and adopting an updated capital financing policy.

INFRASTRUCTURE STRATEGY AND PERFORMANCE: In 2017, LCA updated its computerized maintenance management system, incorporated asset management projects into a pre-existing Capital Improvement Plan, and began developing an Asset Management Strategy.

PRODUCT QUALITY: LCA aimed to eliminate Sanitary Sewer Overflows (SSOs) by developing measurements and a cost-sharing methodology agreed upon by municipalities and City Signatory municipalities through multi-stakeholder dialogue. In 2017, LCA also drafted a Capacity, Management, Operation, and Maintenance (CMOM) Program and a Sewer Capacity Assurance & Rehabilitation Program (SCARP) Improvement Implementation Plan.



Reflections and Lessons Learned from LCA's First Year of EUM Implementation

EUM strengthened and contributed to other management and continuous improvement approaches that LCA already utilized. LCA leadership believe that EUM works well with its existing management approaches. For example, LCA's workforce planning and knowledge management programs predated implementation of the *EUM Primer* by ten years. EUM helped refocus the organization on these important areas, while creating a process for ongoing evaluation and communication of related LCA activities and achievements.

The EUM framework is accessible to organizations of any size or any level of background in strategic planning. LCA's CEO reflected that this is a tool by which any organization could immediately gain value: "Starting strategic planning or measurement processes can be overwhelming, but EUM simplifies that process and takes the mystery out of it." LCA leadership found the *EUM Primer* to be a relatable framework that provides a common language to talk about the utility's priorities and challenges.

LCA's organizational culture has benefited from the EUM implementation process, as employee interest, ownership, and motivation have increased. Engaging in the highly collaborative process of identifying organizational priorities and related objectives has generated internal buy-in and allowed LCA's employees to feel ownership over the process and results. Furthermore, employees report significant interest in the prioritized Attribute of Employee and Leadership Development. LCA leadership notes that openly discussing challenges, such as managing retirement risk, has had a positive impact by demonstrating to employees that the organization is aware of these issues and striving for improvement.

EUM has helped build credibility with LCA's Board through a transparent goal-setting and prioritization process. Though LCA is still in the first stages of incorporating EUM practices and tools, it has already proven to be extremely helpful in facilitating transparent and clear communication with the Board about challenges, priorities and goals. CEO Liesel Gross shared, "Increased transparency through the use of EUM in our goal-setting and prioritization processes has gone a long way in helping our Board understand why we're asking for funding and support for certain projects." Particularly as related to asset and infrastructure projects, LCA's leadership found that EUM has been instrumental in articulating priorities and gaining traction, momentum, and funding for projects and activities.



Starting strategic planning or measurement processes can be overwhelming, but EUM simplifies that process and takes the mystery out of it.

– Liesel Gross, CEO

Scottsdale Water

The City of Scottsdale Water Resources Division (Scottsdale Water), has a central vision that is embodied by staff and communicated to customers daily: "Water Sustainability through Stewardship, Innovation and People."

Scottsdale Water is committed to ensuring its product, its services and its culture exemplify this vision. The utility found *Effective Utility Management: A Primer for Water and Wastewater Utilities* (the EUM 'Primer') to be a useful framework for continual improvement and strategic planning, first implementing EUM in 2014 and building on an existing Strategic Plan and Water and Wastewater Master Plan. Scottsdale Water has become a leader in Effective Utility Management, winning the AMWA Platinum Award for Utility Excellence in 2015, and sharing their ongoing experiences and innovations with water sector partners.



System Profile



Scottsdale, AZ
Southwestern U.S.



Colorado, Salt, and Verde Rivers



Combined Water + Wastewater
Municipal Department



2nd water treatment plant online since 2006
Absorbed Stormwater Quality Program in 2014



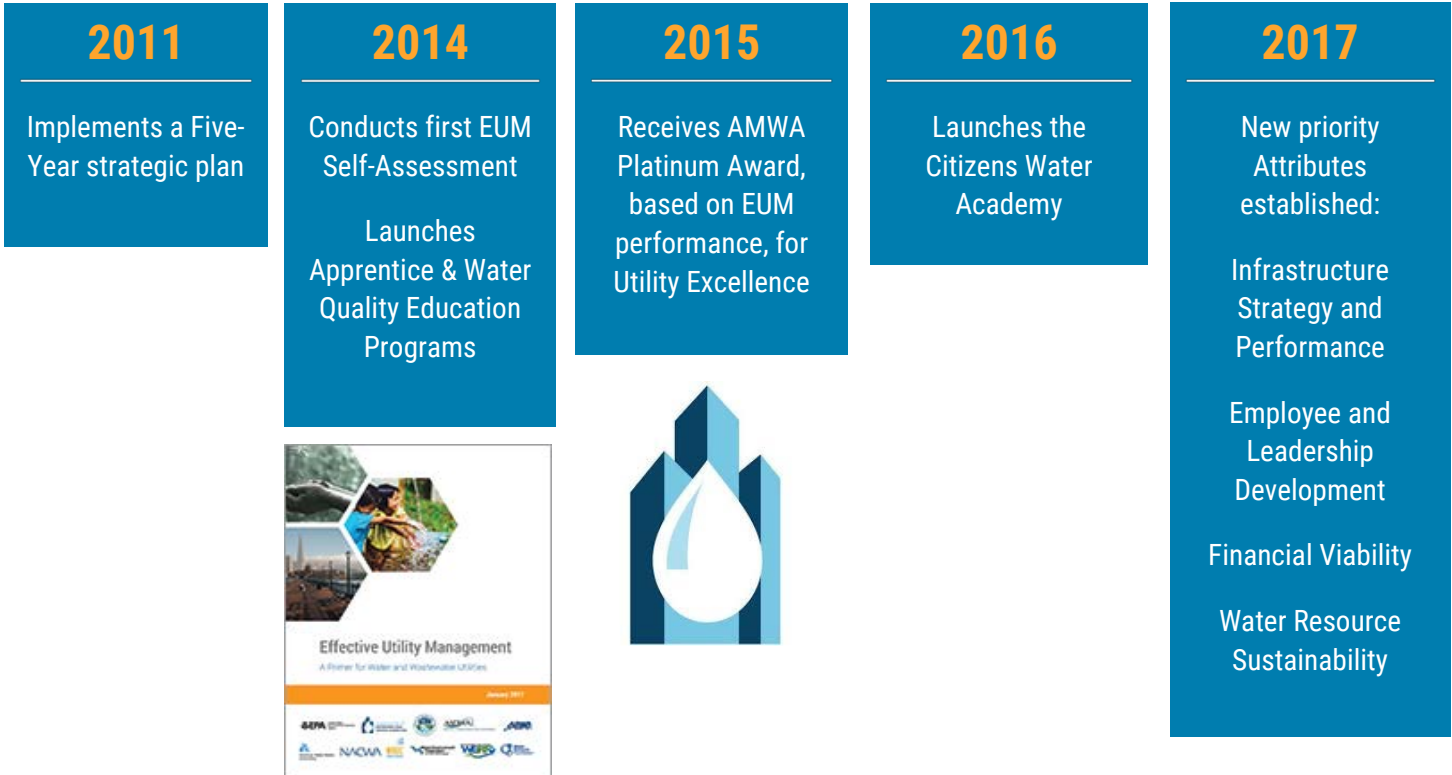
Executive Director reports to the City
Manager and City Council



	Water	Wastewater
Customers Served	88,000	80,000
Lines	2,000 mi.	1,400 mi.
Plant Capacity	100 MGD	40 MGD

EUM Helped to Strengthen Existing Efforts

In 2012, Scottsdale Water was ahead of schedule to achieve most of the objectives outlined in its five-year Strategic and Water and Wastewater Master Plans. Rather than sit back and relax, the organization seized the opportunity to implement an EUM-based intermediate effort to strengthen existing efforts and identify additional items that may not have been included in the Strategic or Master Plans, such as workforce or organizational development. The Scottsdale Water Resources Department Director was familiar with the *Primer* through his role implementing EUM at another utility prior to joining Scottsdale Water in December 2012. In early 2013, the Scottsdale Water leadership team presented the EUM Attribute framework and management concepts to the Scottsdale City Manager and gained full support to begin implementation in the following year.



Scottsdale Water’s Annual EUM Self-Assessment and Attribute Implementation Process

Scottsdale Water began to implement the EUM framework in 2014, when it conducted the utility Self-Assessment outlined in the *EUM Primer* for the first time. Since then, Scottsdale Water has conducted an EUM Assessment annually.



The annual Self-Assessment process at Scottsdale Water involves the Management Team, made up of approximately twenty individual mid-level to senior managers. Each individual completes the assessment, with the results compiled, reviewed, and discussed during an internal meeting.

After identifying priority Attributes to address in that fiscal year through the Self-Assessment, members of the Management Team propose projects that will strengthen performance in each priority Attribute. Scottsdale Water has learned from past experience that by including a broad range of management (rather than only asking for participation

Effective Utility Management

Scottsdale Water is committed to continual improvement and uses the EUM process as one method of doing so:

- Division identifies new projects each year
- Rank EUM Attributes
 - Based on utility vision, goals, and specific needs
 - Rank current level of achievement for each Attribute
 - Rank importance of each Attribute
- Choose 3-4 Attributes for focus each year based on scores
- Identify projects under each of the three Attributes
- Vote on projects
- Identify 3-5 projects per Attribute to complete
- Assign to teams

Scottsdale Water’s EUM Process, as presented at the Association of Metropolitan Water Agencies (AMWA) Executive Management Conference; Oct. 2016

from senior management at the division level) the Assessment garners a wide range of ideas and feedback, and strong internal support for the projects.

The Management Team votes on the project proposals to select three to five projects per Attribute for the year. The selected projects are assigned to a team that oversees the projects for each Attribute area, tracks progress, and reports to the full Management Team quarterly.

While some priority Attribute projects carry over from year to year, most projects target completion in a one-year timeframe. If a project requires a financial commitment greater than available in the predetermined fiscal year budget, that project is incorporated into planning and slated for the following year. The EUM process at Scottsdale Water thereby provides an opportunity for continuity of priority projects between fiscal years, greater detail in budget proposals and employee ownership and engagement.

EUM allows you to address the “people side” of your business. [A traditional Master Plan] tends to focus on assets and structure, but those aren’t the only important components to a successful utility.

- Brian Biesemeyer, Director

Keys to Management Success: The Scottsdale Water Approach

The EUM Five Keys to Management Success are frequently used management approaches and systems, which create a supportive context for a utility as it works towards its desired outcomes across the Ten Attributes. The table below summarizes some of Scottsdale Water’s key management approaches relative to each of the Five Keys. Some of these approaches have been taken up in response to Scottsdale Water’s annual Self-Assessments, while others were already employed by Scottsdale Water prior to utilizing the *EUM Primer*.

Key	Scottsdale Water Approach
Measurement	Operations and system performance measure are reported daily, monthly and annually; Key Performance Indicators reported monthly to Division management team
Knowledge Management	Technology Master Plan; Updated Information Access System; Internal Communication Program; Operations Planning and Scheduling meeting; Asset Management Database
Strategic Business Planning	Five-year Strategic Plan and Master Plan; Progress Reported to City Executive Team and City Council Quarterly; Long- and Short-Term Capital Improvement Plans
Continual Improvement Management	Leadership Engagement Program, After-Action Reviews; EUM Annual review; Bimonthly progress assessment meetings
Leadership	Apprentice Program for Water and Wastewater Treatment; Recruitment Program; Leadership Engagement Program

EUM Initiatives for Improved Attribute Performance

Scottsdale Water's priority Attributes have shifted from one fiscal year to the next, based on its annual Self-Assessment exercise.

- **FY2014-2015:** Employee and Leadership Development; Enterprise Resiliency; and Infrastructure Strategy and Performance.
- **FY2015-2016:** Operational Resiliency; Stakeholder Understanding and Support; Customer Satisfaction; and Operational Optimization.
- **FY2016-2017:** Infrastructure Strategy and Performance; Employee and Leadership Development; Financial Viability; and Water Resource Sustainability.

Each year since adopting the EUM framework, Scottsdale Water has accomplished numerous projects, as well as the associated process and service improvements related to its selected priority Attribute areas. A few of the many successful initiatives and the positive results since 2014 are described below

EMPLOYEE AND LEADERSHIP DEVELOPMENT: In 2014, Scottsdale Water created its Apprentice Program to engage prospective employees newly entering the workforce. The utility also expanded its recruitment program to include attending job fairs and industry conferences to increase visibility as a utility and as an employer, and continues to implement both initiatives. The utility began implementation of an Employee Leadership and Development Program in 2016 to improve training for supervisors through quarterly leadership training sessions, reinforcing Scottsdale Water's commitment to help young supervisors develop professionally.

INFRASTRUCTURE STRATEGY AND PERFORMANCE: In 2014, Scottsdale integrated a Technology Master Plan into its water and wastewater master plans, aiming to approach technology as strategically and proactively as other its other infrastructure. Scottsdale completed the Technology Master Plan in 2017, with development including an evaluation of the Division's critical communications and operations systems. The Technology Master Plan outlines the utility's plans to maintain, upgrade or replace these systems. The utility also implemented an electrical equipment safety assessment program. This program addresses infrastructure stability, employee safety, and Enterprise Resiliency.

STAKEHOLDER UNDERSTANDING AND SUPPORT: In 2016, the utility created Scottsdale Water Citizens Academy; see the text box by the same name for additional details.

OPERATIONAL OPTIMIZATION: In 2015, Scottsdale Water launched an employee safety campaign, which was well-received by employees and has improved safety in Scottsdale facilities. That same year, the utility implemented a project to optimize their pump-back system to maximize the amount of wastewater returned to the Advanced Water Treatment Plant to be processed and recycled. With Scottsdale's complicated geography, optimizing the complex pump-back system required lift station renovations as well as collaborating with regional partners.

FINANCIAL VIABILITY: Scottsdale Water increased the use of paperless billing in 2017, in addition to implementing a Procurement and Budget Training for employees to gain greater support and understanding of procurement, budget and finance processes internally.

CUSTOMER SATISFACTION: In 2015, Scottsdale Water invested in new signage on the Advanced Water Treatment Plant campus to improve the visitor experience.

SCOTTSDALE CITIZENS WATER ACADEMY

The Water Academy was formed as a part of the EUM process, drawing inspiration from popular police and fire academies. The utility has created an opportunity for citizens to understand the science, engineering and labor required to deliver quality water to the citizens of Scottsdale. In the spring of 2016, twenty residents participated in the inaugural six-week Academy.

The Water Academy takes place twice a year, with residents applying in advance to attend six weeknight sessions over the course of a month-and-a-half. The course includes presentations, tours, demonstrations, hands-on science experiments, and interactions with the Scottsdale Water employees that clean and recycle the City's water daily. In a follow-up survey, 100% of participants rated the Academy as "excellent" or "very good," and many listed "meeting and listening to staff" as one of the best aspects of the experience.

By participating in the Academy, residents and stakeholders will better understand the value they gain from what they pay for water. "This has been a huge step with our citizens to get them engaged in what we do," said Director Brian Biesemeyer. "It's also been great for our workforce to hear from citizens that the work they do is appreciated." In only a little over one year since the first cohort "graduated" from the Academy, the Water Citizens Academy has already proven to be a highly successful initiative for Scottsdale Water, its staff, and its customers.



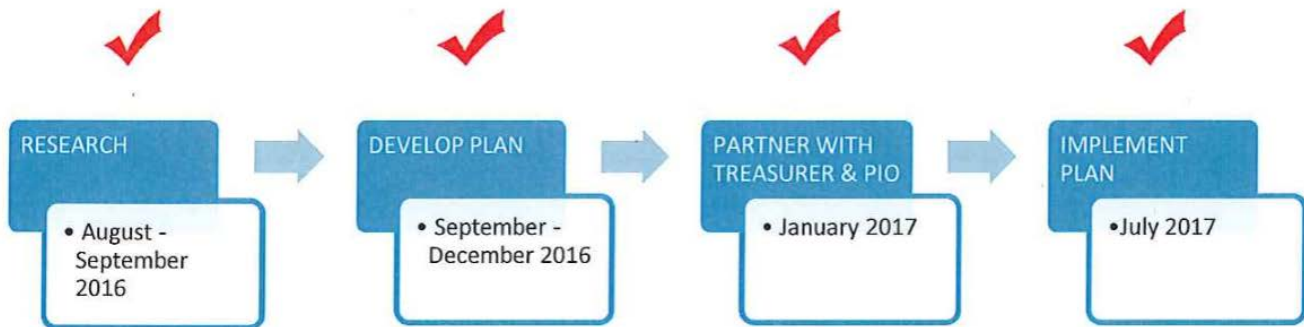
Measuring and Communicating Progress

Scottsdale Water has formed internal teams for each of its priority Attributes. These teams oversee the annual projects under that Attribute. Once EUM-related projects are selected through the Management Team assessment and voting process outlined above, they are assigned to the corresponding team, which reports quarterly on project progress during Management Team meetings.

The visual on the following page is from Scottsdale Water's EUM June 2017 Management Team Meeting Report, and provides an example of how the Management Team tracks and communicates progress for a given project.

Effective Utility Management Financial Viability June 2017 Activity Summary

Area 2: INCREASE USE OF PAPERLESS BILLING



In addition to the quarterly EUM Management Team meetings, monthly Key Performance Indicator (KPI) Reports include both qualitative and quantitative measures to benchmark progress. Scottsdale Water shares progress internally during bi-annual All-Staff Meetings, and externally, through annual presentations to City Council, the Citizens Water Academy, and association conferences.

Takeaways and Lessons Learned

Identifying an internal champion for priority Attribute areas ensures that the utility makes progress towards EUM-related goals. Scottsdale Water leadership acknowledges that utility staff are busy, and each individual has his/her own job and day-to-day tasks which can distract from moving EUM-based projects forward. For Scottsdale Water, the key to overcoming this challenge has been to engage senior management as champions for individual efforts, who are invested in the outcomes and provide motivation to move EUM-related projects forward throughout the year.

In addition to the explicit benefits of EUM-related projects, Scottsdale Water has seen an added benefit of improved morale and increased engagement from the management team and workforce through the EUM process. The inclusive process of selecting priority Attributes and related projects has built ownership and increased staff engagement. Furthermore, during staff meetings, Scottsdale Water provides updates on EUM projects that are underway in specific areas to improve the utility, which has proven to be a positive way to keep staff apprised of progress.

EUM has allowed Scottsdale Water to address areas that are not specifically included in other continuous improvement frameworks. Traditional Master Planning tends to focus on infrastructure and other assets, but the EUM framework explicitly also addresses the “people” side of the business; a critical component of utility success. EUM provides the flexibility to address continual improvement in a step-wise manner. Scottsdale Water has found EUM to be an impactful tool to achieve benefits for the system, its customers, and City Council.

Boston Water and Sewer Commission

Boston Water and Sewer Commission (BWSC or “the Commission”) strives to provide excellent service to its customers while maintaining cost controlled, efficient delivery of water services and environmental stewardship.



The Boston region has experienced a wide range of extreme weather events since 2005, including heavy rains, abundant snow, and extreme temperatures. In response, the Commission has reviewed and updated its management practices to be more proactive and adaptable. Adapting the tools and concepts outlined within Effective Utility Management: A Primer for Water and Wastewater Utilities (the EUM Primer) helped BWSC address a range of short- and long-term challenges while focusing on achieving its high-level organizational goals.

System Profile



Boston, MA
Northeastern U.S.



Quabbin & Wachusett Reservoirs, via Massachusetts Water Resource Authority



Combined Water + Wastewater
Corporate and Political Subdivision of
the Commonwealth of Massachusetts



Created in 1977; continuous updates to infrastructure



Three-member Board of Commissioners
appointed by the Mayor, confirmed by
the Boston City Council



	Water	Wastewater
Customers Served	600,000 residents	+ 600,000 daily commuters
Lines	442 mi.	646 mi.
Plant Capacity	20 MGD	24 MGD

Incorporating EUM Guidance into the BWSC Management Approach

BWSC took ownership of Boston’s wastewater collection, stormwater drainage, and water distribution systems in accordance with the Enabling Act of 1977. As part of the mandate, the Commission has improved and rehabilitated the systems to ensure the infrastructure can accommodate Boston’s unique weather patterns, including extreme heat, extreme cold, and heavy precipitation. The Commission also now annually updates its three-year Capital Improvement Program (CIP) to proactively manage changing conditions.

In 2008 when the original *EUM Primer* was released, Boston faced flooding, combined sewer overflows, employee turnover and knowledge loss, and an influx of underutilized data from Advanced Metering Infrastructure (AMI). In response to these challenges—and as a means to address topics not already included in its CIP—the Commission adopted aspects of the EUM framework after learning about the *Primer* through member associations.



The Utility Self-Assessment at BWSC

To kick off its EUM implementation in 2008, BWSC conducted a Commission-wide Self-Assessment. This focused on understanding improvement opportunities and identifying specific near- and long-term actions relative to challenges facing the Commission. Staff and division directors filled out the Self-Assessment individually, and the Commission compiled these results.

The assessment found that across the organization, Customer Satisfaction was highly rated in terms of both current performance and importance for continued focus. BWSC also determined that Employee and Leadership Development was a high priority for the utility, but needed work to reach its desired level of performance. The new focus on Employee and Leadership Development highlighted a need to improve Knowledge Management practices (one of the Keys to Management Success outlined in the *EUM Primer*), especially to support knowledge transfer as long-term employees began to retire.

In 2013, the recently-hired Executive Director launched an internal process to update the results from the 2008 assessment. Based on results of the internal assessment, BWSC leadership commissioned a third-party evaluation, utilizing aspects of EUM

as a framework. The Commission combined the results of the external evaluation with those of the internal self-assessment, and decided to prioritize Operational Optimization at an organizational level.

In addition to the organization-wide assessments, Division heads identify annual goals relative to the Attributes and report to the Executive Director on the progress toward these goals throughout the year. As part of this goal-setting process, many Divisions undertake a Self-Assessment on a yearly basis, as a way to identify areas for improvement and track progress on prior goals. Examples of these goals and quarterly progress report-outs are provided below.

In 2015, BWSC applied for and received the Association of Metropolitan Water Agencies (AMWA) Platinum Award for Utility Excellence, which is structured around the Ten EUM Attributes and the EUM Five Keys to Management Success. BWSC leadership team members noted that the process of completing the application was an excellent exercise that prompted reflection upon the Commission's performance to-date, and helped them to identify Attribute areas and aspects of the Management Keys to Success that still had room for improvement.

The EUM Self-Assessment is a clever tool that forces you to prioritize your goals, and organize a path to achieve them in an efficient and effective manner... [The EUM Primer] materials are structured in a way that your organization can continually revisit them as a means of measuring progress towards achieving its goals.

- Mike Nelson, Director of Engineering

EXAMPLES OF BWSC'S DIVISION-LEVEL EUM GOAL-SETTING PROCESS

Example Goal 1: Engineering Division

Goal: Investigate mechanisms to notify customers of upcoming work, water main shutdowns or emergencies that occur.

1st Quarter Reported Results: Ongoing customer service coordination continues. Notices are being prepared and provided to the customers. Electronic mechanisms have been discussed with the Communication's Department and are being investigated.

2nd Quarter Reported Results: Ongoing customer service coordination continues. Notices are being prepared and provided to the customers. Monthly updates on large scale projects are being prepared and posted on the website as well as distributed to email address books. Electronic mechanisms have been discussed with the Communication's Department and are being utilized for scheduled water main shutdowns done by Construction.

Example Goal 2: Administrative Division

Goal: The American Water Works Association (AWWA) recommends that meters 3" in diameter be tested every three years, 4" meters in diameter every two years and meters 6" and larger every year. In order to maintain this program, 450 – 500 meters need to be tested every year.

1st Quarter Reported Results: During the first quarter the Meter Division tested 1,518 meters. 154 of the meters were 3" or larger and 1,364 meters were 2" or smaller. Meter Services will continue to test large meters in accordance with the AWWA recommended test schedule, all working meters that are changed out and all meters requested to be tested by customers.

2nd Quarter Reported Results: During the second quarter the Meter Division tested 1,091 meters. 204 of the meters were 3" or larger and 887 meters were 2" or smaller. Meter Services will continue to test large meters in accordance with the AWWA recommended test schedule, all working meters that are changed out and all meters requested to be tested by customers.

Taking Action: Applying the EUM Framework and Approach

EUM has been a guideline and a resource to open our eyes to areas where we weren't as strong as we thought we were. We've used EUM-thinking to innovate, and applied the framework to new and existing programs.

- Mark Van Dam, Executive Assistant to the Executive Director

Once EUM-related projects are selected by Division heads, managers within the five Divisions become the driving force responsible for these initiatives. Department managers lead and track progress of the specific initiatives and activities, and report regularly to the Division head, who then reports to the Executive Director. Creating accountability for the Attribute projects by establishing internal champions for priority Attributes and related projects is a major factor for BWSC's EUM-related successes to date.

Since 2008, BWSC has identified and implemented a number of initiatives to address areas for improvement across the EUM Attributes.

Employee and Leadership Development: BWSC has placed substantial focus on improving knowledge transfer within the organization as a key way to grow new employees. In 2017, BWSC created a lecture series where long-term staff give lectures to newer staff on knowledge obtained over the course of their careers as a way to share "tribal knowledge," preparing for upcoming retirements and subsequent knowledge loss. These lectures are open to all staff, and they are recorded and posted on the internal shared drive for future reference. The first two lectures in 2017 were highly reviewed by staff and the lectures are now held on a monthly basis.

In a separate learning initiative, the Commission sent three Engineering Division directors to attend an EUM Workshop in 2017. Participants felt the workshop was extremely valuable and helped them gain hands-on experience with the *EUM Primer*. The directors who participated highly recommended sending additional staff to future EUM-based workshops.

I walked away from the EUM training with a sense of organization and direction for how to improve our utility.

- Mike Nelson, Director of Engineering

In addition to sending additional staff to future EUM workshops as a professional development opportunity, BWSC is implementing its new EUM knowledge as part of its operations. As a result of the workshop, the Director of Construction plans to use the EUM framework to improve the process for planning, designing, and constructing Green Infrastructure at BWSC.

In 2014, BWSC conducted an internal review of Commission training practices with the aim of additional improvement to Employee and Leadership Development activities. The review prompted the Commission to update its technical training and safety programs to be more hands-on, and to increase tuition reimbursement for employees in support of new professional growth opportunities.

Enterprise Resiliency: In 2014, a new Chief Information Officer joined the Commission and conducted an internal assessment of the IT Department. Findings from this assessment highlighted areas for improvement in the Enterprise Resiliency Attribute area. As a result, the Commission developed a Disaster Recovery Plan and began to implement the plan in 2017, under the leadership of the IT Department.

Operational Optimization: BWSC leadership reports that EUM shifted the organization into a strategic planning mindset, allowing the Commission to be proactive rather than reactive, especially in its wastewater operations and maintenance. As a result of the 2013 Self-Assessment and external evaluation, the Commission expanded its strategic planning efforts past the

infrastructure-focused CIP and into other areas of the organization. This expansion led to the creation of an Operations Strategic Plan.

The Commission also implemented a new risk-based software system which assists Commission staff to determine which sewer or drainage assets are most in need of repair or replacement, based on predictive risk, and developed a five-year Information Technology Strategic Plan in 2014 based on the IT Department's annual self-assessment exercise.

Customer Satisfaction: BWSC has continued to improve and grow its customer-based programs as a result of EUM. To serve an important customer group in need, the Commission increased rate discounts offered to elderly citizens. It also worked to communicate more proactively with customers. In this regard, **Water Resource Sustainability** has also been an aspect of the improved customer relations: BWSC helps customers track leaks through Automatic Meter Reading (AMR) data. Phase II of the AMR program began in 2014 when Commission installed units that track water consumption hourly. As a result, the Customer Service Department can notify ratepayers when consumption spikes (a common indicator of leaks). "This type of customer service was not something we did before EUM," said one BWSC staff member in 2017.

Since first implementing EUM, we have improved communication with ratepayers and our complaints have gone down substantially.

- BWSC Leadership Team Member

IMPROVING WATER QUALITY AND COMMUNITY ENGAGEMENT THROUGH PARTNERSHIP WITH BOSTON PUBLIC SCHOOLS

In 2015, the Commission began work with Boston Public Schools (BPS) as the school system began developing its 10-year Facilities Master Plan (released in March 2017). BPS renovations offered an opportunity for the Commission to engage proactively with the community and simultaneously address compliance requirements. The Commission worked with the BPS Facilities Management Department to design and provide funding for the construction of Green Infrastructure (GI) at five Boston public schools as part of the planned renovations.

Many Boston public schools are located within the tributary areas for the Charles River. Integrating GI into their development projects will improve water quality and reduce phosphorus loads in the Charles River. Phosphorus is a chief culprit for dramatic algae blooms that plague the Charles River during the summer months. BWSC received a 2015 Stormy Award from the New England Stormwater Collaborative¹ in recognition of this innovative stormwater management program.

BWSC also collaborated with school staff members to develop curricula around GI and water quality to be taught in 5th- and 7th-grade classrooms. GI play spaces paired with integrated curricula, provide a safe and enjoyable outdoor recreation area and a hands-on opportunity for kids (and teachers) to learn about the Commission's work and the importance of water stewardship.

Using EUM as a guideline to put the program together, the Commission thought strategically from the outset to maximize the return on investment in the initiative. As a result, BWSC designed a collaborative project that will improve its performance in a number of Attribute areas, including **Product Quality, Stakeholder Understanding and Support, Community Sustainability,** and **Water Resource Sustainability.**

EUM as a Framework for Continual Improvement in Product Quality

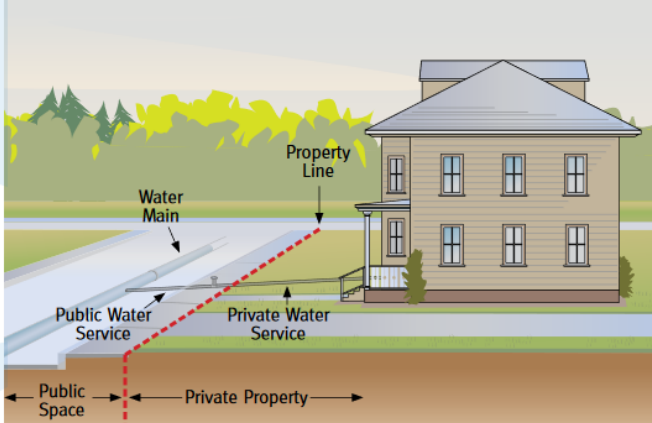
In late 2016, the Mayor of Boston asked the Commission to focus more explicitly on Product Quality. BWSC utilized the EUM framework to identify specific initiatives that advance multiple areas of its operations and improve performance across a number of Attribute Areas.

The Mayor's request and subsequent strategic reflection led BWSC to update its pre-existing Lead Removal Incentive Program by doubling the Program's financial incentive offerings and extending the period for interest-free payments. The graphic on the right is an excerpt from BWSC's Program brochure.¹ Although the BWSC lead program was instituted in 2007, reprioritizing Product Quality prompted the Commission to revisit the program with a new EUM-oriented perspective. The update to the program had a positive impact on Product Quality, as well as in the Attribute areas of Customer Satisfaction and Stakeholder Understanding and Support.

The Lead Replacement Incentive Program at Boston Water and Sewer Commission

What Is a Private Water Service?

It is the portion of the water service pipe running from the property line into the building. This pipe may be made of or contain lead.



The Program

The Lead Replacement Incentive Program exists to encourage Boston's property owners to replace private lead water services. While private water service connections are the responsibility of the owner, Boston Water and Sewer Commission (BWSC) has developed this voluntary grant program as an incentive to remove lead from water services. Financial assistance in the form of a credit up to \$2,000 towards the cost of the replacement and the ability to pay interest-free over a 48-month period are available to eligible property owners.

Who Is Eligible?

Boston property owners are eligible to participate in the Lead Replacement Incentive Program if **all** of the following conditions are met:

- ▶ The property is served by a **two-inch or smaller water service pipe, which contains lead.**
- ▶ The water and sewer account for the property is active and not delinquent.
- ▶ The property owner agrees to have the work done by BWSC.
- ▶ The work presents no extraordinary physical obstacles.

BWSC reserves the right to determine eligibility of a property.

¹ http://www.bwsc.org/SERVICES/Programs/Lead_Brochure.PDF

Keys to Management Success: The BWSC Approach

BWSC considers the Five Keys to Management Success as it works towards its desired outcomes across the Ten Attributes; it approaches each of the Keys through a variety of practices. In addition to the strides BWSC took to improve its internal Knowledge Management through activities related to Employee and Leadership Development (described earlier), the Commission:

Measures progress and shares benchmarks regularly: BWSC engages in a collaborative goal setting process via submission of Monthly Management Report Goals, which are reported in a Commission-wide Report Status Update; sets Tactical and Strategic Goals; and reports Key Performance Indicators (KPIs) on a monthly departmental basis.

Takes a proactive approach to **Strategic Business Planning** via the renewal and rehabilitation of its water infrastructure through the CIP, in its five-year Strategic Information Technology Plan. Through aggressive leak detection and repair and progressive metering programs, BWSC continues to reduce its unbilled and unaccounted-for-water.

Established internal best management practices, which are revised regularly. It also updates its CIP annually as part of its **Continual Improvement Management** approach.

Takeaways and Lessons Learned

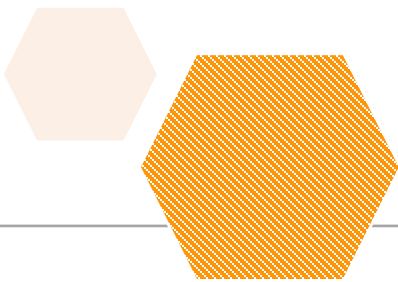
Since its inception, the EUM Primer has been an effective tool to ensure that our ratepayers are getting the most bang for their buck. The beauty of the Primer is that there are no 'MBA words' – just strong management practices.

- John Sullivan, Chief Engineer

“Take it one step at a time.” BWSC has found over nearly ten years of EUM-based work that full implementation of the Attributes and Keys takes time, and highlights that it is indeed a *continuous* improvement process. The Commission took immediate strides forward by applying EUM to low-hanging fruit. By using the *EUM Primer* as a guideline, the Commission continues to tackle the “big issues” one step at a time.

EUM, and especially the Self-Assessment, have broadened BWSC’s perspectives on successful utility management. Through the EUM framework, the Commission leadership considered and improved areas it had not tracked previously, such as Employee and Leadership Development. Even in Attribute areas in which the Commission performs well, such as Customer Satisfaction, EUM has provided an impetus for continued innovation and improvement.

BWSC’s day-to-day operations have improved dramatically as a result of EUM, especially in the areas of Customer Service, water efficiency, Knowledge Management, Stakeholder Understanding and Support, Employee and Leadership Development, and Enterprise Resiliency. EUM helps reinforce effective practices already in place and provides a streamlined framework for improvement.



EFFECTIVE UTILITY MANAGEMENT IN ACTION

Utility Case Examples

