

Memorandum

*To: Marisa Flores Gonzalez, Austin Water
Teresa Lutes, Austin Water*

From: Peter Mayer, WaterDM

*Copied: Dan Rodrigo, CDM Smith
Bill Davis, CDM Smith*

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*Subject: Austin Water Integrated Water Resources Plan
Task 4 – Demand Management Options Screening
CDM P/N: 0590-114879*

Water conservation programs (i.e., demand management) have been and will continue to be a critical element in Austin’s management of water resources. Accordingly, Austin Water (AW) and the Water Forward Task Force have established water conservation as a major focal point for the Integrated Water Resource Plan (IWRP). Thus, an important task of the IWRP is to describe existing conservation measures implemented by AW, identify potential new options for future implementation, screen the potential new options to a list of those best analyzed as potential components of the IWRP, and characterize and quantify those measures (Task 4). This memorandum summarizes the demand management options screening effort and results. The outcome of this process will be a list of the ten demand management measures to be fully evaluated for cost and benefits and thereby carried forth into the subsequent task of portfolio development.

1.0 Screening Criteria and Weights

The screening process for assessing the potential demand management options under consideration for the IWRP focused on a total of four broad qualitative criteria:

- **Incremental Water Savings Potential:** This criterion provides a qualitative, comparative assessment of the incremental water savings potential for a given measure. Each measure is scored numerically from a 0 to 5, with 0 indicating very little water savings potential and 5 indicating significant water savings potential. The water savings potential for each measure is determined based on consideration of current or historical programs that have targeted the end-use targeted by the measure, additional savings that can be achieved by that measure given the extent of the sector/end use demand currently, new vs existing development, the 100-year planning horizon that projects an addition of roughly 3 million additional people to be serviced, and success that other utilities have had implementing a similar program.

- **Incremental Utility Cost of Implementation:** This criterion characterizes the incremental utility cost of implementing a measure. Each measure is scored numerically from 1 to 5, with 1 indicating significant expense and 5 indicating minimal costs. The utility cost of implementation scoring takes into consideration whether the measure requires rebate investments, staff time and resources, potential for requiring capital expenditures, and the complexity of designing an ordinance or code, for examples, and considers how these costs might change over time.
- **Ease of Implementation:** This criterion provides a qualitative assessment of how difficult or easy it will be to implement a given measure. Each measure is scored numerically from 1 to 5, with 1 indicating the measure is extremely difficult to implement with many hurdles and 5 indicating minimal implementation challenges and minimal additional staff/resources required. The ease of implementation scoring for each measure takes into consideration customer/stakeholder acceptance or resistance, programmatic design challenges, enforcement assumptions, and technological hurdles.
- **Incremental Customer Cost of Implementation:** This criterion characterizes the incremental customer cost of implementing a measure. Each measure is scored numerically from 1 to 5, with 1 indicating significant expense to the customer and 5 indicating minimal customer expense. The customer cost of implementation scoring takes into consideration the potential costs that would be absorbed by the customer for a given measure, such as cost of compliance, cost of equipment/materials, maintenance, and considers how these costs might change over time.

These four criteria are then combined (as follows) to develop a single weighted score:

- Incremental Water Savings Potential was assumed 50% of weighted score.
- The Incremental Utility Cost of Implementation, Ease of Implementation, and Incremental Customer Cost of Implementation are also assumed 50% of weighted score.

For the purposes of calculating the weighted score, the incremental water savings potential was multiplied by three and then added together with the remaining scores. The highest potential score is a 30, which would indicate a demand management measure that has high water savings with low overall costs that is easy to implement.

2.0 Demand Management Options

The demand management options list was developed through a collaborative process, with options developed based on previous task force recommendations, input from the Water Forward Task Force members, AW staff, the public, and the consulting team.

Of the initial 25 options, two were re-categorized as supply side options, two were determined to be continuing best management practices, and three were determined to be necessary implementation

components to other options. The remaining options were combined or split out into one or more options, thereby reducing the number of options for screening to thirteen.

To recap, given the list of potential measures that was ultimately developed and for which input was sought, through discussions with AW staff and the consulting team several options were determined to be best handled through separate processes, as follows:

- The options to require or incentivize expansion of the use of the current reclaimed water system along with option to require or incentivize building plumbing innovations such as dual plumbing were moved to the supply side list.
- The option to require or incentivize government-recognized energy and water efficiency-labeled residential and commercial fixtures and the option to incentivize or require toilet, urinal, and bathroom faucet aerator efficiencies were determined to be “*continued best management practices*” to be included in demand offsets separately (i.e., off-the-top reduction from the baseline forecast that does not require evaluation through the IWRP process) and reflects Austin Water’s longstanding programs to incentive, require or freely distribute these fixtures.
- Three options were determined to be “*implementation components*” of a successful conservation program and were not further evaluated or screened. These measures include water rates and fees to promote water use efficiency while maintaining affordability, customer education enhancements, and use of social media programs and web-based content to promote conservation. These types of programs are indeed critical to a successful program but do not necessarily have significant water savings of their own, but rather they assure the successful implementation of other programs.

The remaining measures were then combined or split out into one or more options so that, if selected to be fully evaluated, the option would represent a single definable measure with scalable parameters. For example, ordinances and incentives for landscape transformation have different costs on a per unit basis at the utility-level, thus the implementation approach is assessed as two different options. This approach will allow further assessment of a range of potential implementation approaches within the options characterization process. As another example, graywater was identified as being an alternative water source that has characteristics that differ from other sources (such as rainwater or stormwater) because of the implementation complexity and thus was analyzed as a separate measure. In total, 13 demand management options for the screening were identified and delineated, as shown in **Table 2-1**. The goal of the screening process is to identify the ten demand management options for fuller characterization and use within the portfolio development process.

Table 2-1 List of Demand Management Measures for Screening (listed alphabetically)

Measure Name	Measure Description	Sector; End Use	Target ¹
Alternative Water Incentives	Incentivize on-site (building-scale) alternative water use (for rainwater, stormwater, blackwater, and ac condensate)	All; Nonpotable with potential for potable RWH in Single Family	Existing
Alternative Water Incentives - Graywater	Offer an Incentive to encourage the installation and use of graywater systems	All; Nonpotable indoor and irrigation	Existing and New
Alternative Water Ordinances	Require on-site (building-scale) alternative water use (for rainwater, stormwater, blackwater, and ac condensate)	Multifamily, Commercial; Nonpotable	New
Automated Metering Infrastructure (AMI)	Implement customer-facing programs that provide real-time water use information (including commercial customer benchmarking), including identification of customer-side leaks and other water-saving opportunities (implemented through Automated Metering Infrastructure - AMI)	All; All	All
CII Ordinances Cooling Towers and Steam Boilers	Require older cooling towers to meet water efficiency benchmarks and use efficient equipment and require efficiency standards for steam boilers in new development	Commercial; Cooling towers, Steam Boilers	Existing
CII Ordinances Swimming Pools	Require swimming pool efficiency (retrofit)	COA, Multifamily, Commercial; Pools	Existing
Development-focused Water Use Estimates/ Benchmarking Plan Submittal	Require water use estimate submittal for new development concurrent with preliminary plan submittal, to be reviewed by City staff for comparison to benchmarks. As part of this review, City staff will provide potential water use efficiency recommendations and information on available incentive and rebate programs.	All; All	New/Re-development
Development-focused Water Use Estimates/ Benchmarking Seller Disclosure	Require sellers of commercial property to provide written disclosure of older water using equipment not meeting current standards or fixtures at point of sale to buyers and City staff	Commercial; All	All
Irrigation Efficiency Incentives	Expand current irrigation rebate programs to include irrigation system controllers that respond to leaks, high pressure, and soil moisture; Incentivize retrofit of grandfathered irrigation systems to encourage more efficient irrigation systems	All; Irrigation	Existing
Irrigation Efficiency Code Change	Replace existing code that requires installation of a permanent irrigation system with a code that allows for installation of a temporary irrigation system to establish permanent landscaping	Multifamily, Commercial; Irrigation	New
Landscape Transformation Ordinances	Implement ordinances to encourage water use efficiencies and reduce water needs for outdoor irrigation and other goals through regionally appropriate landscapes with an emphasis on landscape functionality (Implementation of this option could	All; Irrigation	New

¹ For this analysis, the definitions for existing/new sectors are tied to the development permitting and review process. “Existing” is any development that has received a certificate of occupancy. “New” would include any new construction in the process of obtaining permitting approvals.

Measure Name	Measure Description	Sector; End Use	Target ¹
	include implementing turf grass area, irrigated area, and/or irrigation area limitations)		
Landscape Transformation Incentives	Implement incentives to encourage water use efficiencies and reduce water needs for outdoor irrigation and other goals through regionally appropriate landscapes with an emphasis on landscape functionality (implementation of this option could include increasing WaterWise landscape rebates for residential and multifamily and implementing a new WaterWise landscape rebate for commercial)	All; Irrigation	Existing
Water Loss Control Utility Side	Enhance current utility –side water loss control programs	System Wide; Nonrevenue Water	N/A

3.0 Screening Results

Based on the screening criterion described in Section 1.0, the list of measures identified for screening were scored based on professional judgment of the CDM Smith team in consultation with AW conservation staff, as detailed in the scope. Results of the screening are provided in **Table 3-1**. The tables that follow provide the general assumptions that went into scoring each measure. Where readily available, examples of similar programs are provided.

Table 3-1 Demand Management Measure Screening Results

Rank	Measure Name	Incremental Water Saving Potential	Incremental Cost Implementation Utility	Ease of Implementation	Incremental Cost Implementation Customer	Weighted Score
1	Landscape Transformation - Ordinances	5	2	2	2	21
2	Automated Metering Infrastructure (AMI)	4	1	1	5	19
3	Water Loss Control Utility Side	3	1	1	5	16
4	Landscape Transformation - Incentives	3	2	3	2	16
5	Irrigation Efficiency - Incentives	2	3	4	2	15
6	CII Ordinances - Cooling Towers and Steam Boilers	2	4	3	2	15
7	Alternative Water - Ordinances	3	3	1	1	14
8	Development-focused Water Use Estimates/ Benchmarking - Plan Submittal	2	2	2	4	14
9	Alternative Water -Incentives	2	2	3	2	13
10	Alternative Water Incentives - Graywater	1	2	2	3	10

11	Development-focused Water Use Estimates/ Benchmarking - Seller Disclosure	1	2	1	3	9
12	CII Ordinances - Swimming Pools	1	3	2	1	9
13	Irrigation Efficiency - Code Change	0.5	4	2	1	8.5

1. Landscape Transformation - Ordinances					
Measure Name	Description				
Definition	Implement ordinances to encourage water use efficiencies and reduce water needs for outdoor irrigation and other goals through regionally appropriate landscapes with an emphasis on landscape functionality. Implementation of this option could include implementing turf grass area, irrigated area, and/or irrigation area limitations.				
Savings Score	5 - Future outdoor use represents the largest potential demand sector in Austin over 100 years. Regionally appropriate landscapes requiring minimal supplemental irrigation beyond establishment could reduce future outdoor use by a considerable amount. Savings from this measure would need to be evaluated in light of current 1x per week irrigation restrictions.				
Utility Cost Score	2 - Landscape ordinances will take time and effort to develop in the beginning and will require additional staff resources to implement and enforces. Costs could reduce in the long-term.				
Implementation Ease Score	2 - In the early phases of implementation, effort will be required to inform, educate and to inspect, and verify to ensure proper implementation. Will require coordination with other departments in Austin and the land development code.				
Customer Cost Score	2 - Customer costs for landscaping may be higher initially until the industry fully adapts to the ordinances. Over the long-term perspective, customer costs will decline as the incremental costs come down.				
Notes	A long-term effort yielding substantial water savings in a critical sector. Incremental customer costs are expected to decline over time.				
Examples	<table border="1"> <tr> <td><i>California</i></td> <td>The State of California has a Model Water Efficient Landscape Ordinance (MWELO) which sets a maximum applied water allowance on landscape areas for all new construction. The formula used to calculate the estimated total water use has limits on the percent of landscape that is irrigated turf. This percentage has been changed over time.</td> </tr> <tr> <td><i>Colorado</i></td> <td>Westminster Colorado has landscape ordinances requiring minimum soil amendments and mulch for all new landscapes, coupled with inspections and verification. A water use analysis approach to the connection fee calculations provides financial incentive for water efficiency across all new buildings and landscapes.</td> </tr> </table>	<i>California</i>	The State of California has a Model Water Efficient Landscape Ordinance (MWELO) which sets a maximum applied water allowance on landscape areas for all new construction. The formula used to calculate the estimated total water use has limits on the percent of landscape that is irrigated turf. This percentage has been changed over time.	<i>Colorado</i>	Westminster Colorado has landscape ordinances requiring minimum soil amendments and mulch for all new landscapes, coupled with inspections and verification. A water use analysis approach to the connection fee calculations provides financial incentive for water efficiency across all new buildings and landscapes.
<i>California</i>	The State of California has a Model Water Efficient Landscape Ordinance (MWELO) which sets a maximum applied water allowance on landscape areas for all new construction. The formula used to calculate the estimated total water use has limits on the percent of landscape that is irrigated turf. This percentage has been changed over time.				
<i>Colorado</i>	Westminster Colorado has landscape ordinances requiring minimum soil amendments and mulch for all new landscapes, coupled with inspections and verification. A water use analysis approach to the connection fee calculations provides financial incentive for water efficiency across all new buildings and landscapes.				

2. Automated Metering Infrastructure (AMI)	
Measure Name	Description
Definition	Implement customer-facing programs that provide real-time water use information, including identification of customer-side leaks and other water-saving opportunities (implemented through Automated Metering Infrastructure - AMI); AMI + customer portal and engagement with personal electronic technology (including commercial customer benchmarking).
Savings Score	4 - The future efficiency potential from customer information and engagement brought about by AMI is significant. Preliminary studies suggest a 5% reduction in residential usage from engagement efforts. This technology is still in its infancy and implementation will help reduce customer side leaks and excessive use for years to come.
Utility Cost Score	1 - AMI and customer engagement software represents a significant investment for AW. Over the next 100 years, the AMI system equipment is likely to be replaced multiple times as equipment ages.
Implementation Ease Score	1 - Metering and meter replacement is standard utility function, but AMI implementation will require substantially more effort and maintenance over time. Implementation of this option may be more difficult as development of a new customer portal will be required.
Customer Cost Score	5 - This measure is not anticipated to have required significant customer-side incremental costs.
Notes	This is an in-process option that is focused on better measuring and managing supply as well as increasing customer engagement. It is expected that all water utilities will eventually utilize these technologies.
Examples	<i>Austin, TX</i> Pilot scale AMI project underway
	<i>Fort Collins, CO</i> AMI leak alert program started in 2015, notifying customers with continuous use. Leveraging AMI for Leak Detection www.watersmartinnovations.com/documents/sessions/2015/2015-W-1532.pdf
	<i>East Bay MUD</i> Various AMI pilots and evaluation of engagement software platforms.
	<i>Valencia, CA</i> Water budgets linked with AMI technology for advanced customer communication.
	<i>Leesburg, VA</i> Reduced non-revenue water from 15% to 7% since installing AMI

3. Water Loss Control – Utility Side	
Measure Name	Description
Definition	Enhance current utility-side water loss control programs
Savings Score	3 - As Austin's system ages over the next 100 years, advanced water loss control will yield increased water savings. Water loss in systems 50 - 100 years older than AW is much higher. New water loss control technologies are expected too.
Utility Cost Score	1 - A significant incremental expense for AW, particularly if the costs of leak repair and pipe replacement are included.
Implementation Ease Score	1 - Water loss control is already a core AW utility function. The enhanced program will require more utility staff and effort and may face challenges associated with capital project implementation.
Customer Cost Score	5 - This measure is not anticipated to have required significant customer-side incremental costs.
Notes	As Austin's system continues to age, reducing water loss will become increasingly important.
Examples	<i>Georgia</i> State mandated annual validated water loss audits. Funding tied to steady improvement.

3. Water Loss Control – Utility Side		
Measure Name	Description	
	<i>Texas</i>	The City of Fort Worth submitted a SWIFT application for implementation of AMI with an automated leak detection system. Water loss for the City was estimated at 14%. The expected annual volume of water conserved was estimated at 9,450 AFY. http://texaslivingwaters.org/wp-content/uploads/2016/11/SWIFT-Guidance-Documents_FINAL.pdf
	<i>California</i>	Major new state water loss control initiative focused on training, education, audit validation, and continuous improvement.
	<i>Texas</i>	Water loss audits are required by State for all retail public water suppliers every five years. Retail water suppliers with greater than 3,300 connections are required to submit an audit annually.

4. Landscape Transformation Incentives		
Measure Name	Description	
Definition	Implement incentives to encourage water use efficiencies and reduce water needs for outdoor irrigation and other goals through Regionally Appropriate landscapes with an emphasis on landscape functionality. Implementation of this option could include increasing WaterWise landscape rebates for residential and multifamily and implementing a new WaterWise landscape rebate for commercial.	
Savings Score	3 - Current outdoor use represents about 22% of total metered demand. Regionally appropriate landscapes requiring minimal supplemental irrigation beyond establishment would help adapt landscapes to require less water and could further reduce outdoor use by a considerable amount. Savings from this measure would need to be evaluated in light of current 1x per week irrigation restrictions.	
Utility Cost Score	2 - AW already offers landscape transformation incentives and has a program in place for implementation. The incremental cost of expanding the program is scalable and comparatively low.	
Implementation Ease Score	3 - A moderate level of effort is anticipated as the program expands. This option will require coordination with other departments (WPD) and the Land Development Code.	
Customer Cost Score	2 - Customer receives an incentive, but replacing landscaping can be expensive. Compared with other measures, there will be some incremental customer costs.	
Notes	This measure will accelerate water savings and landscape transformation in Austin.	
Examples	<i>California</i>	Metropolitan Water District and member agencies implemented a massive turf replacement program in 2014-16. Thousands of acres of turf were converted and more than \$370 million in rebates were provided.
	<i>Nevada</i>	The Southern Nevada Water Authority developed and continues to implement a landscape incentive program focused on locally appropriate plantings. Significant impact and reduction in turf landscapes.
	<i>Colorado</i>	Water utilities and a local non-profit team annual to offer "Garden in a Box" plant packages, aimed a regionally appropriate landscaping.

5. Development-focused Water Use Estimates/ Benchmarking Plan Submittal		
Measure Name	Description	
Definition	Require water use estimate submittal for new development concurrent with preliminary plan submittal, to be reviewed by City staff for comparison to benchmarks. As part of this review, City	

5. Development-focused Water Use Estimates/ Benchmarking Plan Submittal	
Measure Name	Description
	staff will provide potential water use efficiency recommendations and information on available incentive and rebate programs.
Savings Score	2 - Beginning with a development review process focused on sensible efficiency recommendations, the water savings may be relatively small. Over the 100 year timeframe, this effort will likely evolve into a process where new buildings in Austin are scored against efficiency benchmarks. Eventually this could lead to the creation of a reasonable water allocation (water budget) for every new (and eventually existing) property in Austin that could be used to benchmark efficiency. Phased implementation of this option could lead to more substantial water savings over time.
Utility Cost Score	2 - This will require significant effort at the outset, but overtime as benchmarks are established and the process become more routine, effort will be reduced.
Implementation Ease Score	2 - A challenging implementation for AW at the outset. This option could build off the Austin Energy Green Building program or AW Service Extension Request process. This option could be resource intensive in terms of staffing and process to establish benchmarks.
Customer Cost Score	4 - Some additional time and resources may be expended by customer/contractor/engineer for this preliminary submittal. No incremental cost to current customers. Future customers benefit from built-in water efficiency.
Notes	Could be an important step for AW in the direction of customer-specific water efficiency and ensuring new buildings join the system as highly water efficient from the start.
Examples	<i>Colorado</i> Westminster Colorado charges substantially higher connection fees based on increased tap size and anticipated water usage based on customer type and size. This brings new buildings to the table with water efficiency built-in to achieve a lower connection fee.
	<i>California</i> A water budget approach to both new and existing customers has been used by a handful of utilities for years, and has recently been adopted widely across the state. The State has embraced this approach from the customer up through the utility itself.

6. Irrigation Efficiency Incentives	
Measure Name	Description
Definition	Expand current irrigation rebate programs to include irrigation system controllers that respond to leaks, high pressure, and soil moisture. Incentivize retrofit of grandfathered irrigation systems to encourage more efficient irrigation systems.
Savings Score	2 - Impacts to existing irrigation systems and savings are assumed to accrue in first 20 - 30 years only. Savings likely to be small with 1x per week irrigation restrictions.
Utility Cost Score	3 - Moderate incremental cost. Scalable, based on rebate level.
Implementation Ease Score	4 - AW already offers an irrigation incentive for residential and a smart controller incentive for multifamily and commercial with programs in place for implementation. AW also offers free evaluations for residential and mandatory irrigation audits for commercial and multifamily. The incremental effort of expanding the program is scalable and comparatively low.
Customer Cost Score	2 - Customer's receive an incentive, but must bear the costs of system repair and replacement. Compared with other measures, there will be some incremental customer costs.
Notes	Incentives could be designed to assist in landscape transformation as well. Impacts existing customers. Savings likely to be small with 1x per week irrigation restrictions.
	<i>Arizona</i> Tucson and other cities offer rebates for drip irrigation and climate based control

6. Irrigation Efficiency Incentives		
Measure Name	Description	
Examples	<i>Utah</i>	Salt Lake City. WaterCheck irrigation audits and system upgrades. Rebates.
	<i>Texas</i>	San Antonio (SAWS) has offered a variety of irrigation efficiency programs. Dallas Water Utilities also offers free irrigation system check-ups.

7. Alternative Water Ordinances		
Measure Name	Description	
Definition	Require on-site (building-scale) alternative water use (for rainwater, stormwater, blackwater, and air conditioning (AC) condensate) for new developments in the multifamily and commercial sectors	
Savings Score	3 - Applies to future construction which represents a big portion of future demand. Scalable.	
Utility Cost Score	3 - These regulations will be complex to design, implement, and regulate, particularly in the early stages. Over time, the implementation effort could be reduced.	
Implementation Ease Score	1 - The challenges of design and early stage implementation are unknown and could be significant.	
Customer Cost Score	1 - Mandating these systems will increase the cost of land development. Installation of these systems would require dual plumbing. Long term maintenance of these systems adds to customer expense as well.	
Notes	While generally expensive and challenging to implement, this option could provide savings and other benefits. As with all measures, savings must be proven for this to be considered a reliable source of future demand reduction for Austin.	
Examples	<i>Australia</i>	Gold Coast Water, south of Brisbane mandated dual plumbing and on-site capture systems during the millennial drought. Most systems were quickly abandoned once the drought ended. AWE published a "lessons learned" from the Australian drought report.
	<i>San Antonio, Texas</i>	San Antonio requires new commercial construction on or after January 1, 2006, to have a single independent condensate collection line to collect condensate for use as process water, cooling tower makeup, and landscape irrigation.

8. CII Ordinances Cooling Towers and Steam Boilers		
Measure Name	Description	
Definition	Require older cooling towers to meet water efficiency benchmarks and use efficient equipment and require efficiency standards for steam boilers in new development	
Savings Score	2 - Impacts cooling towers installed prior to 2008. New equipment is assumed efficient by code. All savings accrue in the first 30 - 40 years.	
Utility Cost Score	4 - Incremental utility cost is comparatively small.	
Implementation Ease Score	3 - Enforcement and verification patterned after existing car wash program through registration, third-party inspection paid by customer, and self-reporting will help with ease of implementation.	
Customer Cost Score	2 - Complying with the cooling tower requirement portion of this option would have low to moderate costs for customers.	
Notes	This measure is currently being considered as part of the plumbing code adoption cycle.	
Examples	<i>Colorado</i>	Denver Water has had trouble maintaining long term water savings from cooling tower retrofits.

8. CII Ordinances Cooling Towers and Steam Boilers	
Measure Name	Description
	<i>California</i> MWD offers different cooling tower incentives, but has not established formal requirements.

9. Alternative Water Incentives	
Measure Name	Description
Definition	Incentivize on-site (building-scale) alternative water use (for rainwater, stormwater, blackwater, and AC condensate) for existing developments
Savings Score	2 - Applies to existing development as retrofit. Scalable.
Utility Cost Score	2 - Program would add to complexity of existing programs. Over time, the implementation effort could be reduced.
Implementation Ease Score	3 - Design and early stage implementation could be built off of existing incentive programs for rainwater harvesting and ac condensate.
Customer Cost Score	2 - Even with an incentive, these systems are usually expensive to retrofit. Installation of these systems would require dual plumbing.
Examples	<i>Australia</i> Gold Coast Water, south of Brisbane mandated and incentivized dual plumbing and on-site capture systems during the millennial drought. Most systems were quickly abandoned once the drought ended. AWE published a "lessons learned" from the Australian drought report.

10. Alternative Water Incentives - Graywater	
Measure Name	Description
Definition	Offer an Incentive to encourage the installation and use of graywater systems, which are defined as shower-to-toilet and landscape irrigation systems that collect shower, faucet, and laundry discharge, provide some element of filtration and treatment and then reuse the water.
Savings Score	1 - Limited water savings potential as clothes washers, faucets, and showers become more efficient and use less and less water. Less and less graywater will be produced.
Utility Cost Score	2 - Comparatively expensive to implement. Incentives would need to be substantial to achieve meaningful participation rates. 2017 AWE study found some potential long term benefits for water utilities, but also cautioned about the lack of cost effectiveness and demonstrable savings data. ²
Implementation Ease Score	2 - Graywater systems are complex. Implementation from the utility perspective will be on a long-term time frame requiring staff effort.
Customer Cost Score	3 - From the AWE report, "if the total life-cycle costs of the system exceed the total life-cycle savings from reduced potable water purchases, the system will have a net cost to the homeowner." This is the expected outcome from most systems.
Notes	The 2017 research indicates that graywater systems have yet to be proven cost-effective from the customer or the utility perspective.
Examples	<i>Australia</i> Gold Coast Water began installing on-site systems during the millennial drought. These systems were quickly abandoned once the drought ended.

² Gauley, Bill (2017) *Water Savings and Financial Benefits Associated with Single-Family Package Graywater Systems*. Alliance for Water Efficiency. Chicago, IL.

11. Development-focused Water Use Estimates/ Benchmarking - Seller Disclosure							
Measure Name	Description						
Definition	Require sellers of commercial property to provide written disclosure of older water using equipment not meeting current standards or fixtures at point of sale to buyers and City staff						
Savings Score	1 – This is not a mandate for water efficient fixtures, only for disclosure. Water savings could be significant if turned into a "retrofit on resale" requirement as California has just done. Without a mandate or incentive, the potential for water savings should be assumed limited, until proven.						
Utility Cost Score	2 - Setting the "current standards" and developing the process that must be met will be an on-going challenge for AW. Requires staff effort and will likely require new staff because of real estate transaction complexity and reporting.						
Implementation Ease Score	1 - Expect significant pushback from the real estate industry and commercial property owners. Anything that complicates the transfer of real property is generally seen as an impediment. Monitoring real estate transaction will be difficult, especially for the commercial sector.						
Customer Cost Score	3 - Customer cost would likely be low to moderate but could have cost and transaction time impacts.						
Notes	While savings are scored low, the effort could evolve into a major contributor to future water efficiency in Austin if retrofit on resale was included.						
Examples	<table border="1"> <tbody> <tr> <td><i>California</i></td> <td>State law mandates 1.28 gallons per flush (gpf) toilets and other fixtures in all single-family residences. Effectively a retrofit on re-sale ord. Expected to be enforced as part of the inspection and title transfer of real estate.</td> </tr> <tr> <td><i>California</i></td> <td>City of Burbank has "retrofit upon resale" requirements for residential properties that went into effect in 2010. https://www.burbankwaterandpower.com/water/rules-and-regulations-water/retrofit-upon-resale-requirements</td> </tr> <tr> <td><i>California</i></td> <td>City of San Diego has "retrofit upon resale" requirements for residential properties that went into effect in 2000. https://www.sandiego.gov/water/conservation/selling</td> </tr> </tbody> </table>	<i>California</i>	State law mandates 1.28 gallons per flush (gpf) toilets and other fixtures in all single-family residences. Effectively a retrofit on re-sale ord. Expected to be enforced as part of the inspection and title transfer of real estate.	<i>California</i>	City of Burbank has "retrofit upon resale" requirements for residential properties that went into effect in 2010. https://www.burbankwaterandpower.com/water/rules-and-regulations-water/retrofit-upon-resale-requirements	<i>California</i>	City of San Diego has "retrofit upon resale" requirements for residential properties that went into effect in 2000. https://www.sandiego.gov/water/conservation/selling
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12. CII Ordinances Swimming Pools	
Measure Name	Description
Definition	Require commercial and public swimming pool efficiency (retrofit)
Savings Score	1 - The sector impacted is comparatively small. 100-year savings are relatively small.
Utility Cost Score	3 – Varies; measures range from water efficient backwash filters to major leak repairs.
Implementation Ease Score	2 – High level of staff expertise and effort required for successful implementation.
Customer Cost Score	1 – Incremental cost of implementation for customers with pools could be substantial.
Notes	Require swimming pool efficiency (retrofit)

13. Irrigation Efficiency Code Change	
Measure Name	Description
Definition	Replace existing code that requires installation of a permanent irrigation system with a code that allows for installation of a temporary irrigation system to establish permanent landscaping
Savings Score	0.5 - Water savings would be most realized if combined with another option like landscape transformation.
Utility Cost Score	4 – Once implemented this requirement would not have a significant utility cost impact.
Implementation Ease Score	2 – Challenging to implement initially, but easier over time. Would require coordination with Watershed Protection Department and consistency with the Innovative Commercial Landscape Ordinance.
Customer Cost Score	1 – Could be “cost neutral” to customers depending on implementation approach.