Preliminary Descriptions for Demand Management Alternatives Selected for Recon Evaluation and MCDS Exercise

This summary presents descriptions and a preliminary evaluation of three Recon Level alternatives based on input from Maddaus Water Management and Rosenblum Environmental Engineering.

- **WaterSmart Software.** WaterSmart software is a tool to help start engaging customers' interest in active conservation programs. The software organizes water use information to help engage customers, and allows customer-specific responses by staff. WaterSmart software analyzes billing data to disaggregate indoor and outdoor usage, lot size, home characteristics, location, the impact of weather and seasons, and any efficiency measures installed as part of a conservation program. Comparisons are made with other similar customers but no physical measures or incentives are delivered.

  The WaterSmart software needs to interface with billing data, and this could require a very large effort outside the scope of any contract with WaterSmart. The effectiveness of customer communications increases with the timeliness of the information conveyed, which could require upgrades to both billing software and hardware (especially if the website is to deliver monthly values shortly after meter readings).

  Providing tailored recommendations to customers, including rapid detection of leaks, could require installation of advanced meters. Although the cost of the advanced meters themselves has gone down in recent years, installation costs and data acquisition and management software make up most of the implementation cost.

  Another expense of effective deployment will be hiring and training staff to answer customer queries, to initiate communications with customers using unusually high volumes, and to modify the website in response to needs and demands.

  WaterSmart software - and similar offerings by others - should be seen as one tool to help start engaging customers' interest in active conservation programs. It could become the basis for gradually building effective conservation program performance monitoring, but currently - like all "big data" efforts - it only compares individual customers to the overall population. Software to analyze and validate overall trends and evaluate the value of possible technical and behavioral changes could be developed as monitoring results accumulate.

  Maddaus has provided some preliminary cost and water savings information on WaterSmart. Their analysis is below.

  Cost Basis: Utility costs of $6.20/account are based on WaterSmart's software program cost of $132,000 per year. A pilot study for 5,000 accounts for 6 months was estimated to be $20,000 for WaterSmart software.

  Savings Basis: Water savings are based on WaterSmart's reporting of approximately 2%-5% savings per account while taking into account the City's lower per capita use; this results in a smaller savings at about 1% per account. Because City residents are already on high alert about their water use due to drought restrictions and pricing and because

the City is planning a very robust conservation program, the marginal savings of having this measure as well is much less than it would be in a community that is just waking up to conservation and not going through a drought. The California Water Foundation presents WaterSmart Software's water savings in their online "Project Profile" series found here: http://californiawaterfoundation.org/uploads/1363734622-CWFProjectProfile-WATERSMART.pdf

- **Water Neutral Development.** The water neutral development proposal envisions that developers of new buildings offset water demands by (a) implementing the most water-efficient measures in new construction and (b) funding conservation in existing buildings and facilities so that in total, water demand will not increase. Since the water supply system is already stretched beyond sustainable yields, and salt water intrusion already needs to be halted, a net reduction in demand is likely needed - not only stabilization.

  This measure would most likely apply to projects over a certain size, such as housing projects of 5 or more dwellings or nonresidential developments of more than 50,000 square feet. Projects below the minimum size standards would only save water through the existing applicable – plumbing and landscape codes - that would make new development approximately 20% more efficient than existing homes. Determining overall savings would require additional research into current city development sizes, the minimum size standards set, the technology/requirements required, etc.

  A quantitative analysis is needed to define a cost-effective implementation path:

  - The depth of conservation needed for a significant impact on water supply and salt-water intrusion.
  - Feasible demand reduction in new construction and in existing facilities, and the balance between them required to attain significant impacts on supply and salt-water intrusion.
  - Evaluation of wastewater benefits, including on-site reclamation.
  - Life cycle cost analysis of demand-reduction scenarios beyond code, including all water and wastewater costs and benefits. Financing options, such as low-interest/long-term loans with "on bill" repayment, should also be considered.

  Other considerations include:

  - The impact fee would need to be set to be equitable, but high enough to generate needed water savings without making new housing much more expensive. In the example from Alamo Creek the utility (East Bay Municipal Utility District) set the initial conservation fee at $6,000 per home. This amount was less than one percent of the typical price of new homes in this project. It was also low compared to water and sewer connection fees. The fee for Santa Cruz could be determined with some effort on modeling the measures with and without additional money for higher incentives generating more participants.

- The size of the threshold for this measure to be triggered would need to be set after reviewing typical current project sizes and the cost of the city to administer this measure.

- **On-site Rainwater Harvesting and Gray Water Use at the Residential Level.** This option pursues reuse of gray water to irrigate landscape and storage and use of rainwater for domestic, non-potable use. This could involve using large rain catchment systems or rain barrels.

In Australia, where bans on the use of potable water for irrigation were in effect for many years, rainwater tanks are popular. In addition, most home-owners collect sink and shower water in containers and irrigate manually. Rain tanks make up a large majority of rebate applications for water conservation programs, but even with the rebates, payback periods are very long (14-60 years), indicating that cost-effectiveness is not the prime motivation.

Maddaus Water Management provided the following evaluation of costs and water savings for this alternative.

Support Residential Rain Barrels

This measure will provide incentives for the installation of rain barrels. This could involve rebates or bulk purchase and giveaways of barrels plus workshops on proper installation and use of captured rain water for landscape irrigation.

Cost Basis: The City will pay for 50% funded through rate payers. The customer performs the installation. If the rain barrel the City provides were available locally, the City would probably stop selling them and offer a rebate instead due to storage and delivery challenges. The City may also add a rebate anyway so people have more choice in models and sizes. Currently the City sells subsidized rain barrels to customers. This measure also includes an education and promotion element.

Savings Basis: Water savings assumes 4 effective rain barrel fills per year for 20 years. A rain barrel has a 20 year useful life. The savings from this measure is due in part to 1.5% savings from actual water savings from barrel and 3.5% from behavioral change.

Residential Rain Barrel Fixture Costs			
	Utility	Customer	Fix/Acct
SF	$30.00	$30.00	1

Residential Rain Barrel Savings Per Replacement	
	% Savings per Account
SF Irrigation	5.0%

Large Rain Catchment System

This measure provides incentives for the installation of large rainwater catchment systems up to 2,500 gallons. This could involve rebates, grants and other cost share methods. This measure might require the

simultaneous installation of water efficient landscaping to assure that amount of water collected is capable of lasting into the peak irrigation season.

Cost Basis: City pays 30%. This measure is modeled after the City of Santa Rosa's program.

Savings Basis: Water savings assume 3 effective fills per year for 20 years.

Large Rain Catchment System Fixture Costs			
	Utility	Customer	Fix/Acct
SF	$500.00	$1,500.00	1

Rain Catchment Savings Per Replacement	
	% Savings per Account
SF Irrigation	5.0%

Gray Water Retrofit

In this measure the City will provide a workshop to support a Gray water Challenge similar to the 2013 event that was modeled after the Sonoma County program. This measure will offer a rebate to assist single family homeowners in covering a certain percentage of the cost to install a gray water system. Package from local hardware stores have the primary components of this retrofit that would be supported by City's rebate.

Cost Basis: The grey water retrofit system costs approximately $450 and the City will pay approximately 30%. The customer pays for installation.

Savings Basis: Water savings assumes a single fixture type system will be used to replace a portion of garden watering on new or existing homes. In the summer, a washing machine use of approximately 25 gpd would cover about 25% of summer use (2x annual average). This measure is based on the continuation of the City's 2013 Gray Water Challenge.

Gray Water Retrofit Fixture Costs			
	Utility	Customer	Fix/Acct
SF	$150.00	$300.00	1