Water Conservation Measures Feasibility Memo & Associated EBMUD Comments

Tully & Young
Comprehensive Water Planning

965 University Avenue, Suite 222
Sacramento, California 95825
(916) 669-9356

MEMORANDUM

To: Contra Costa County Department of Conservation and Development

Date: May 4, 2021

From: Greg Young, P.E.
Galen Davis

Subject: Tassajara Parks Water Demand Offset Updated Preliminary Feasibility Analysis

---

This Water Demand Offset Updated Preliminary Feasibility Analysis (Analysis) sets forth an updated evaluation to the preliminary draft Memo (Draft Memo) submitted on February 24, 2021 by Tully & Young, Inc., including, among other items, further development of a market analysis and related provision of preliminary cost estimates for implementing the water demand offset approach described and analyzed in the Tassajara Parks Project (Project) Environmental Impact Report (EIR) (SCH No. 2014052089) as well as specific responses to comments received on the Draft Memo from the East Bay Municipal Utility District (EBMUD or District).

I. INTRODUCTION

By way of brief background, Contra Costa County (County) prepared an EIR for the Tassajara Parks Project (Project EIR) pursuant to the requirements of CEQA that contained a Water Supply Evaluation (WSE), conducted an impact analysis, and concluded that impacts would be less than significant with the implementation of water conservation measures, through the funding, facilitation, and acceleration of those measures, which would offset the proposed Project's water demand, with an additional ample "margin of safety."

The Draft Memo was prepared to address questions raised by District staff in terms of the feasibility of the proposed offset strategy identified in the Project EIR. In response to the Draft Memo, EBMUD staff submitted to the County comments dated March 15, 2021 (Comment Letter), which included recommendations regarding the incorporation of different and/or additional assumptions (collectively, EBMUD Staff-Suggested Assumptions). In particular, and as detailed more fully below, the Comment Letter sets forth certain assumptions that could be construed as narrowing potential conservation offset opportunities, consistent with District staff's stated goal of managing uncertainties to help ensure that risk is not shifted to existing EBMUD customers.

District staff's concerns in this regard are appropriate, and therefore this Analysis evaluates feasibility utilizing those assumptions. That said, in addition to the EBMUD Staff-Suggested Assumptions, this Analysis includes an evaluation that utilizes other reasonable assumptions and augmented methodologies supported by review of available empirical data, information, and materials from the District and other public water entities that have successfully implemented water conservation programs in California and other locations throughout the nation.

In so doing, this Analysis is not intended to dictate specific details of a final water conservation offset proposal since the decision whether to pursue such a strategy and the particular measures included in such a program will ultimately be within the discretion and purview of EBMUD's Board of Directors; and any such decision would only come after the County Board of Supervisors first exercises its local land use authority over the Project.

Accordingly, this Analysis expressly acknowledges the following: (1) EBMUD's Board of Directors must ultimately approve the Project's water conservation offset program, as memorialized in a binding agreement between EBMUD and the Project applicant; and (2) the County, as the lead agency for CEQA purposes, retains the discretion to determine the adequacy of the analysis set forth in the Project EIR.

Further, the purpose of this Analysis is to provide the District and the County with additional information, data, and supporting evaluation that amplifies and clarifies the Project EIR's basis for confirming that the proposed Project's water demand offset approach is feasible.

Specifically, this Analysis considers the comments and methodologies suggested in the Comment Letter from EBMUD staff, and is organized as follows:

- It summarizes each key issue raised by the Comment Letter;
- It provides a detailed response to each key issue; and
- It contains two refined evaluations: (a) one using only the EBMUD Staff-Suggested Assumptions, and (b) one using a blend of assumptions, including those recommended by EBMUD staff as well as those supported by empirical data from EBMUD and other public water entities that have successfully implemented similar water conservation programs in California and elsewhere in the nation.

Comments from EBMUD staff as set forth in the Comment Letter and other comments received from the District in response to the Project EIR are appreciated. These comments help ensure that a thoughtful and robust water supply evaluation is conducted for purposes of informed decision making. In addition, a collaborative approach among the District, the County, and the Project team will provide opportunities for a meaningful water conservation strategy that offsets the proposed Project's water demand, with an additional ample "margin of safety," in a manner that can be effectively and feasibly implemented. We look forward to continuing productive dialogue with the District and County on this matter.

Section 1 – Comment Summaries and Responses

The following provides summaries of EBMUD staff's comments on key issues provided in the Comment Letter accompanied by responses identifying how the comment(s) are addressed and/or otherwise incorporated into the two refined evaluations included under Section 2 and Section 3 below. The organization of this Section 1 is intended to track the order of the comments set forth in the Comment Letter for ease of reference.

I. GLOBAL COMMENTS

A. Conservation Offset Target

1. EBMUD Staff Comment: The Analysis should target 170 acre-feet per year (AFY) of water conservation offset, derived from a 2:1 offset ratio for EBMUD staff's recommended estimate of Project water demand of 85 AFY at build-out.

2. Tully & Young Response: The importance of a thorough evaluation of the feasibility of conservation offsets is critical to ensure impacts are mitigated to a less than significant level and also to confirm that the ultimate conservation offset program does not shift potential water supply-related risks and costs to EBMUD and its existing customers. Therefore, these are treated as fundamental goals in evaluating the feasibility of potential conservation measures.

The Project EIR details conclusions about the estimated water demand; the basis for these conclusions are set forth more fully therein. However, as noted in the Project EIR, it is acknowledged that the EBMUD Board of Directors will need to concur with the demand figure that would ultimately be utilized in developing the water conservation offset program.

Accordingly, the two updated evaluations that follow in Section 2 and Section 3 incorporate the EBMUD Staff-Suggested Assumption of an offset of 170 AFY in water savings for purposes of evaluating feasibility, which can be achieved in a number of ways as described herein.

B. Consideration of Conservation Program Market Potential

1. EBMUD Staff Comment: The Analysis should reflect a reasonable market potential for conservation program participation; in conducting this evaluation, market potential should be limited to the current Customer Assistance Program (CAP)-enrolled subset of customers of 6,000 – 8,000 households.

2. Tully & Young Response: The Project applicant has proposed to focus the Project's conservation program by targeting lower-income households[1] in EBMUD's service area. Doing so would have dual goals: (1) identifying a targeted, although appropriately broad, population for purposes of

[1] Pursuant to California Health and Safety Code Section 50079.5, a lower income household is defined as having an annual income below 80% of area median income.

effectively achieving the required offset; and (2) supporting conservation efforts for lower- income households through adequate subsidies to facilitate implementation.

EBMUD serves nearly 1.45 million people,[2] with nearly 390,000 total connections – the overwhelming majority of which are residential connections. Based on available data from EBMUD, there are likely approximately 69,000 households that qualify for the District's water rate relief program referred to as the CAP, although currently only about 7,000 households (i.e., about 10% of total estimated eligible households) are actually participating even though EBMUD has extensive outreach to attract participants. Therefore, EBMUD staff suggests the Project's conservation program focus should be limited to the existing 7,000 CAP households. In response, one of the two refined evaluations provided below utilizes this EBMUD Staff-Suggested Assumption; i.e., limiting the feasibility analysis to this subset of existing CAP-eligible households.

In addition, this Analysis evaluates feasibility if the program were to extend beyond the limited sub-set of 7,000 existing enrolled households in the EBMUD CAP. Doing so would be acceptable for several reasons, as follows. As a preliminary matter, limiting the feasibility analysis to 7,000 of the 69,000 eligible households is an unnecessary filter. While there may be overlap with CAP-enrolled households, conservation programs could easily gain one-time participants from other low-income households that may not otherwise enroll in CAP. Additionally, it is likely that there are more than 69,000 lower income households within the EBMUD service area that could be eligible for an income-targeted conservation program. For example, the City of Richmond alone has approximately 37,000 households[3] with a median annual income of $72,000.[4] According to available Census data, 32% of the households in Richmond are below the 80% level of the area median income, equating to nearly 12,000 Richmond households that would be presumed to qualify for a lower-income program. Census data for Oakland shows similar results, with approximately 162,000 households having a median annual income at $82,000.[5] Moreover, 40% of Oakland households would be considered lower-income households[6] since they earn an average of $65,000 or less annually. These figures would equate to nearly 65,000 households in the city of Oakland that would qualify as lower-income under the State's definition. Based on these figures, there are approximately 77,000 lower-income households in the cities of Richmond and Oakland alone. These figures show that conservation programs could target a wider array of low-income households than may qualify pursuant to the District's current CAP rules.

Moreover, with respect to barriers that prevent households from participating in the CAP and other water rate assistance programs, it is important to note the fundamental differences between this type of program and water conservation programs. The barriers to enrollment of water rate assistance

[2] https://sdwis.waterboards.ca.gov/PDWW/JSP/WaterSystemDetail.jsp?tinwsys_is_number=31&tinwsys_st_code=CA&wsnumber=CA0110005.

[3] https://www.census.gov/quickfacts/richmondcitycalifornia.

[4] https://censusreporter.org/profiles/16000US0660620-richmond-ca/.

[5] https://www.census.gov/quickfacts/fact/table/oaklandcitycalifornia/HSD410219#HSD410219 .

[6] Based on available census data, the 80% threshold in Oakland would be met by those households earning less than $65,000 annually.

programs are well documented by both EBMUD and other sources, and thus EBMUD's comments regarding CAP participation are acknowledged.

A SPUR report, *Keeping the Water On,* January 2021, outlines barriers to enrollment for CAP and other rate reduction programs. Examples of such barriers include: Complex application processes; additional documentation; and limiting low income thresholds. The EBMUD CAP program application requires verification of gross income for all members of the household in the form of tax returns and/or applicable benefit statements for up to twelve different sources of income. Proof of identity is also required for every member of the household, including minors; Social Security cards are not accepted, only Driver's License or California ID for adults, and medical card or school ID for minors. Appropriate income thresholds are also particularly important in a high-cost region like the Bay Area. A higher income threshold is important in a high-cost region such as the Bay Area, where even households making more than average may struggle with the cost of living. The SPUR report estimates 89,746 eligible low-income households in the EBMUD service area.

As evidenced by the success of programs in other service areas, streamlined application processes and less rigid qualification requirements for water conservation programs can increase program participation. For example, the City of Sacramento's (Sacramento) leak repair assistance program only requires that participants live within a Disadvantaged Community (DAC) as identified by a map published alongside the online application. They will soon be loosening the DAC map requirement to include low income qualified households located anywhere within the service area. The San Antonio Water System (SAWS) application process for their leak repair assistance program is equally streamlined. Further, since participation in a conservation program is a one-time activity, continued enrollment, as is required for a rate assistance program, is unnecessary, which may further encourage participation. Other types of assistance programs also provide helpful models for increasing program adoption. As noted in the SPUR report:

> "*Enrollment rates in other assistance programs are useful as benchmarks for the kinds of penetration that are possible in assistance programs. CalFresh, the state system to provide food aid, is generally considered to have a dismal enrollment rate compared to most assistance programs but still reaches 71% of eligible customers. CARE reaches 84% of eligible customers. This suggests that water assistance programs could reach more people with more resources and more streamlined application processes*." - SPUR report, Keeping the Water On, January 2021.

For the refined evaluation in Section 2, the EBMUD Staff-Suggested Assumption to limit the potential participants to the 7,000 CAP enrollees is used. However, the analysis in Section 3 does not artificially limit offset opportunities to current CAP enrollees. Rather, it defers to EBMUD staff's estimate of 69,000 potential lower-income households that are CAP-eligible. And, the analysis anticipates the 10% participation rate realized by CAP would also occur (e.g., 10% of the eligible low-income households would have a potential leak or desire to replace toilet or take advantage of other available conservation opportunity to be addressed free of charge).

II. LEAK REPAIR PROGRAM

A. Crediting Achieved Water Savings to the Program

1. EBMUD Staff Comment: The Project should only receive credit for leak repairs that would not have occurred but for the proposed Project's offset program. The Analysis does not assume that leak repairs it may fund would not have happened without the Project-funded program.

2. Tully & Young Response: Staff's comment indicates that a certain number of leak repairs would occur in the ordinary course without the Project-funded program, and therefore this Analysis should not take credit for those repairs. While this general comment is noted, staff did not suggest any specific assumptions to be included in this Analysis. Nor did staff identify any specific existing or proposed programs that would subsidize leak repairs for lower-income households. Although the basis upon which staff claims that such repairs would occur is unclear, it is recognized that some leak repair would occur "naturally" throughout all households in the service area – including low-income households presumed to qualify for a leak repair program. While it is reasonable to assume that, in some circumstances, significant leaks discovered by households with resources to remedy them would be fixed and that this would occur in the ordinary course, it would not seem likely this would happen as often in lower income households given the limited financial resources. However, the Project's demand offset target has a 2:1 margin of safety, which as discussed in this memo equates to 170 acre-feet per year, would accommodate any concern of "excessive" crediting for Project-funded conservation savings.

Therefore, it is considered reasonable for the Draft Memo to credit achieved water savings from the Project-funded program without deducting any theoretical repairs in lower-income households given the often-significant financial cost and other constraints that could reasonably be assumed to be in place that would prevent such leaks from being repaired.

Moreover, as explained more fully below, the total amount of estimated savings from the Project-funded program described in the Draft Memo were derived from approximately 1,350 leak repairs, which reflects a conservative 2% of the potential low-income pool of 69,000 households. Even if the number of leak repairs increased to 3,000, this would still be considered a reasonable assumption based on the broader pool, since it would reflect less than 5% of those eligible households. This conclusion is further supported by evidence obtained from other successful leak repair programs and explained in more detail in the Section B: Considering Market Potential.

However, to accommodate EBMUD staff's concern, and absent any actual water use data,[7] the first refined evaluation presented in Section 2 reduced the amount of assumed savings from each leak to only 1,000 gallons per month – or 12,000 gallons per year. That is a 50% reduction from the assumptions utilized in the Draft Memo, which reflected the low end of the water-savings data seen by

[7] Tully & Young requested water use data for Single-Family Residential (SFR) accounts from the District. These requests included monthly metered water use for: (1) All SFR accounts in the service area; (2) SFR accounts tied to geographic indicator for DAC communities; (3) SFR accounts identified by the District as CAP eligible; and (4) SFR accounts currently enrolled in the CAP program. EBMUD staff declined to provide this information based primarily on concerns about privacy; instead, staff simply verbally informed Tully & Young that currently enrolled CAP households have very low water use. The basis for this assumption is unclear.

successful programs such as San Antonio Water System (SAWS), which, even after 20 years of operating its program, still experiences savings averaging between 2,000 gallons to 4,000 gallons per month – or 24,000 to 48,000 gallons per year.[8]

In addition, to provide information that reflects the experience of other successful programs, the second refined evaluation included in Section 3 incorporates the previous estimated savings of 2,000 gallons per month; this is still seen as conservative given that it represents the low end of the average savings as reflected in available data.

B. Considering Market Potential

1. EBMUD Staff Comment: The Draft Memo underestimates the challenges for program implementation, and thus overestimates the opportunity to successfully achieve the estimated conservation offset. Two main issues are identified: (1) the basis for finding 1,350 leaks to repair is not clear, and (2) getting participation beyond those already participating in the CAP program would be very difficult. Furthermore, EBMUD does not have Advanced Meter infrastructure (AMI), making the identification of potential leaks challenging. Thus, the Analysis should be limited to only repairing leaks that may occur within the current set of CAP enrolled households, which ranges from 6,000 to 8,000 households at any time.

2. Tully & Young Response: As detailed in the Draft Memo and further explained below, the data available from two programs were utilized to provide a reasonable basis to demonstrate the market potential leak repair programs. The City of Sacramento shows the large market opportunity for a new program, and SAWS demonstrates the long term effectiveness of a mature leak repair program that is still addressing a meaningful market for water savings.[9]

In 2020 SAWS made 1,328 repairs in a service area with an estimated 95,000 households qualifying as low income. The Draft Memo utilizes 2020 water savings data from SAWS showing that at 2,000 gallons per month savings, 1,350 leak repairs would achieve 100 AFY offset – which extrapolated, would anticipate that less than 3,000 repairs would achieve the 170 AFY offset. Notably, the SAWS "Plumbers to People" program is still finding leaks after decades of operation, and they are still successfully enrolling customers by proactively identifying higher than average water use without the help of AMI technology.[10]

The City of Sacramento provides insight into the opportunity available for a new leak repair program targeting larger leaks in a new market. In Sacramento's first year they assisted 297 customers repairing 1,310 plumbing fixtures, for a savings of 50 AFY. In 2020, Sacramento addressed just 25 houses with

[8] Table 3 in the Draft Memo based savings at a conservative average of 2,000 GPM per fix, or 24,00 gallons per year. The City of Sacramento's 2020 leak repair program saved an average of 75,000 GPM per fix due to larger leak fixes.

[9] San Antonio Water Service (SAWS) Plumbers to People program has been operating for almost 27 years. The City of Sacramento modeled Leak Free Sacramento after the SAWS program and it has been successfully operating for about 4 years.

[10] SAWS and EBMUD service areas have similarly sized populations. San Antonio has 1.5 million people, EBMUD service area contains approximately 1.4 million people.

large leaks for a savings of 71.49 AFY — which extrapolated, would anticipate that about 60 repairs would achieve the 170 AFY offset. Sacramento has an estimated 73,000 low income households.

These two program examples from Sacramento and SAWS are notably different in their market penetration as they are programs at very different stages. Still, in an effort to be conservative this Analysis uses the lower water savings benchmark from SAWS while acknowledging that a new program has large market potential with high opportunity for water savings.

Tully & Young recognizes that if the Project's leak repair program's "eligible account" assumption is limited to the current 7,000 CAP enrollee audience, there would be far less opportunity to find existing leaks and realize conservation savings. Therefore, to address EBMUD staff's comment, the first of the refined evaluations, as presented in Section 2, includes the EBMUD Staff-Suggested Assumption that limits the pool of available households to the approximately 7,000 CAP enrollees.

The second refined evaluation, presented in Section 3, acknowledges that within the recognized low-income households, there would likely be significant additional opportunities for water savings at substantially lower cost, particularly by targeting larger leaks initially. Therefore, this evaluation incorporates the assumption of the broader potential pool of 69,000 low-income households from which to identify interested parties.

C. Program Cost Estimates

1. EBMUD Staff Comment: The Draft Memo should reflect local costs and reflect the challenges with implementation that can drive the per-fix cost higher. EBMUD's suggested full-time equivalent cost for one person to run the proposed leak repair program is $300,000 per year, and, as an example, the cost for a plumber to install pressure regulators is $1,500 per instance. Furthermore, cost information from San Antonio is not comparable because (1) the SAWS program has been established for several decades, and (2) the cost of living in the SF Bay Area is substantially higher than San Antonio.

2. Tully & Young Response: To ensure a thoughtful and conservative analysis, the Draft Memo relied on available data from two model programs that provided a range in budget and cost. For example, in the initial years of operation, SAWS targeted large leaks, but after almost three decades, SAWS has shifted in this regard based on an understanding that the majority of the leaks found are smaller but easier to fix, resulting in a lower average cost per fix but a lower water savings per repair. In comparison, Leak Free Sacramento's program is newer, and in 2020 they focused on large outdoor leaks, which resulted in a higher average cost per repair but with far greater water savings.

Put another way, the cost of leak repair depends on the nature of the subject leak. For instance, smaller leaks normally correlate to a lower repair cost, with larger leaks typically correlating to higher repair costs. The Draft Memo demonstrated this correlation with available data from the two different leak repair programs: (1) In 2020, San Antonio Water Service fixed 1,328 leaks and saved 97.8 acre-feet, at a cost per repair of $442; and (2) the City of Sacramento fixed 25 leaks and saved 71.49 acre-feet, at a cost per repair of $2,427. Many of the leaks in Sacramento were outdoor and involved large leaks on service laterals. The total leak repair program budgets in 2020 were $586,782 for SAWS, and $60,680 for the

City of Sacramento.[11] In other words, the Draft Memo incorporated a range of assumptions to ensure a thorough analysis.

However, in response to EBMUD staff's comments, both refined evaluations in this Analysis use the benchmarks provided by EBMUD staff for administrative program costs. The suggested contractor cost of $1,500 is a reasonable middle ground for the purposes of a feasibility analysis considering the data from the other Leak Repair programs. In addition, the request to include anticipated startup costs and program development, which are reflected with a "Marketing" line item, have been included. The basis for the figure of $300,000 as an annual salary for an EBMUD employee to operate the proposed leak repair program has not been validated[12], however, the suggested annual FTE costs of $300,000 for one Water Conservation Representative is used.

III. DIRECT INSTALLATION OF TOILETS

A. Crediting Achieved Water Savings to the Program

1. EBMUD Staff Comment: The Draft Memo estimates cost of water savings by crediting the program for all water savings resulting from program-funded toilet installations. This is identified as problematic because it does not assume "passive" conservation savings, which equates to eventual replacement of older fixtures with newer, more water efficient fixtures that meet current Plumbing Code (Code) requirements. Applicable Code provisions require new toilets of 1.28 gallons per flush (gpf) or less, and because of the "passive" savings assumption, installing 1.28 gpf toilets would not create "new water" for the Project. To receive water savings credit under this assumption, EBMUD staff submits that the program would be required to install toilets more efficient than 1.28 gpf and "new water" would be calculated based on the difference between 1.28 gpf and the gpf rating for each toilet installed through the program.

2. Tully & Young Response: For similar reasons as provided above regarding theoretical leak fixes, it is considered reasonable for the Draft Memo to credit achieved water savings from the Project-funded program without deducting any savings from theoretical toilet replacements due to current codes mandating the sale of only high-efficiency toilets.

While it is reasonable to assume that some amount of natural toilet replacement could happen over time, the extent is unknown and unpredictable, particularly within lower-income households. Moreover, EBMUD staff did not point to any existing or potential future programs to be implemented by them (without the Project) that would reliably facilitate such a replacement program or an indication of

[11] Program expenditure includes administrative, contractor, and associated FTE costs for outreach and leak identification.

[12] According to the employment website Indeed.com, an EBMUD Water Resource Engineer has an average monthly salary of $10,500, equivalent to $126,000 per year (https://www.indeed.com/cmp/Ebmud/salaries/Water%20Resources%20Engineer?from=acme-salaries-v2). According to the U.S. Bureau of Labor Statistics, wages reflect about 70% of the cost to an employer (https://www.bls.gov/regions/southwest/news-release/employercostsforemployeecompensation_regions.htm). Therefore, it would be reasonable to assume the FTE cost for an EBMUD Water Resource Engineer would be around $180,000.

how many high-water use toilets may remain. Replacing inefficient toilets with high efficiency toilets immediately nets durable water savings, and that is why many urban water suppliers, including EBMUD, have run toilet rebate programs to help speed replacement.[13] One could reasonably presume the toilets targeted in a Project-funded replacement program that focuses on lower-income households would generate real water savings that otherwise would be unlikely occur, at least until a toilet stopped functioning, became irreparable, and required owner-financed replacement. Therefore, it is reasonable for a toilet replacement to treat the water savings as "new water." Additionally, as noted previously, the Project's demand offset target has a 2:1 margin of safety, which as discussed in this memo equates to 170 acre-feet per year. This offset would appear to accommodate any concern of "excessive" crediting for Project-funded toilet replacements.

However, in response to EBMUD staff's comment, the first refined evaluation, presented in Section 2, includes the above-described EBMUD Staff-Suggested Assumption (i.e., limiting the estimated savings based on the difference between 1.28 gpf and the ultra-efficient 0.8 gpf replacement toilet), netting 0.48 gpf, or 2.4 gallons per toilet per person per day (GPD).

The second refined evaluation, presented in Section 3, incorporates assumptions based on the reasoning above and empirical data described in more detail below; i.e., achieved water savings of 27.8 GPD per toilet.

B. Water Savings Per Toilet Installed

1. EBMUD Staff Comment: The Draft Memo assumes 22-33 GPD per toilet installation but is not clear about the underlying assumptions. As suggested in the Crediting Achieved Water Savings to the Program section, the Project should only claim credit for water savings resulting from installation of toilets more efficient than 1.28 gpf, and also limit the analysis to CAP-enrolled customers who have an average household size of 1.9 people. An example methodology for water savings, assuming 0.8 gpf toilets were installed and flushed an average of twelve times per day, would equate to 6 GPD of savings per toilet based on calculating the difference between 1.28 gpf and 0.8 gpf.

2. Tully & Young Response: In an effort to further clarify the basis for the underlying assumptions for water savings, the Draft Memo did not use a GPD per toilet metric; rather it described annual savings per toilet based on available data from three different water suppliers' toilet replacement programs. These savings calculations were derived from each supplier's own savings data, and the Draft Memo presented a range based on actual savings data (i.e., from the most conservative to the largest reported annual savings per toilet). As detailed in the Draft Memo, this empirical data shows that annual water savings estimates ranged from 8,578 to 12,500 gallons per year (GPY) per toilet.

However, in response to EBMUD staff's comments, the first refined evaluation, included in Section 2, uses a methodology that calculates savings based on household size and number of flushes per day,

[13] EBMUD ended its toilet rebate program indicating it had achieved the desired objectives. However, EBMUD has acknowledged additional high-use toilets are still in service but their owners were not incentivized by the rebate alone to replace them. A replacement program can target these additional fixtures.

while incorporating the limited savings assumed (i.e., the difference between 1.28 gpf and 0.8 gpf). This limits the savings to 6 GPD per toilet and an average household size of 1.9 people.

As explained in Section 3 below, the second analysis does not use a methodology that incorporates household size. Nevertheless, it should be noted that the average household size in EBMUD Census designated lower-income areas is 2.99 people,[14] which would substantially increase the assumptions for number of flushes per day compared to the 1.9-person average household size that EBMUD staff directs should be used in calculating water offsets. As previously noted, the second refined evaluation assumes an achieved water savings of 27.8 GPD (10,147 GPY) per toilet. These savings are based on updated empirical data used by San Francisco Public Utilities Commission (SFPUC) to calculate conservation savings for their toilet replacement program.[15] SFPUC, being an adjacent water service area to EBMUD, is helpful to model water savings and rate of replacement for high efficiency toilets.

C. Market Potential.

1. EBMUD Staff Comment: The Draft Memo assumes approximately 2,700 to 3,800 older inefficient toilets in the homes of CAP-enrolled customers would be replaced by new high efficiency toilets. EBMUD staff does not believe it is likely that this many inefficient toilets exist or that that many households could be identified and convinced to participate in a toilet replacement program. In recent years, CAP enrollment has ranged from approximately 6,000 to 8,300 households and the analysis should limit the market potential of the program to that subset of customers.

2. Tully & Young Response: The Draft Memo does not simply "work backwards"; i.e., selecting the number of existing CAP households that would need to have their toilets replaced in order to achieve the required water savings. Rather, the number of toilets that were assumed to be replaced was based on empirical data available from three model water suppliers to determine the number of toilets necessary to achieve the target, which equated to a total of 2,700 to 3,800 toilets, as detailed in the Draft Memo. In other words, the Draft Memo calculated the total number of toilets needed to be replaced in the service area, based on the reported water savings from three successful programs operated by municipal waters suppliers, to demonstrate an ability to achieve the target offset. Achieving the range of 2,700 to 3,800 replaced toilets within EBMUD's service area is considered reasonable given that it reflects replacing one toilet in about 5% of the approximately 69,000 lower-income qualified households. It is likely many of these homes have more than one toilet, which would potentially achieve the target offset with fewer households (but the same number of toilets). SFPUC, for example, replaced 4,462 toilets in their toilet replacement program over the course of three years, even

[14] California Department of Finance, E-5 City/County Population and Housing Estimates, 1/1/2019. Department of Water Resources recognizes Disadvantaged Communities (DAC) based on Household Median Income (HHI). EBMUD Long-Term Financial Stability Workshop identified Oakland, Richmond, San Pablo with HHI below the DAC threshold within the District's service area.

[15] SFPUC's Water Conservation Tracking Model counts all of the water savings from a toilet replacement to active conservation the first year of installation and then applies a natural replacement rate of 3%. The model uses an empirical data observation water savings estimate. For toilet estimates (M.Cubed and A&N Technical Services (2018a, 2018b) estimated toilet, showerhead, and aerator water savings from direct installation bathroom retrofit programs in California. Mean savings for HETs installed in single-family households was 27.8 gpd (10,147 gpy).

after a highly successful toilet rebate program achieved 75% penetration of high efficiency toilets in their service area. The City of Tucson averaged about 850 toilet replacements per year from 2013 – 2016, also *after* highly successful implementation of toilet rebate programs, and for a smaller pool of qualified low-income households.[16]

As discussed above in the global comment response regarding Conservation Program Market Potential, the first refined evaluation, included in Section 2, incorporates the EBMUD Staff-Suggested Assumption that limits the pool of candidates to the subset of 7,000.

The second refined evaluation, included in Section 3, demonstrates program participation and saturation models based on a pool of 69,000 low-income qualified households in the EBMUD service area, based on available data from EBMUD.

While it is difficult to calculate exactly how many toilets remain in the EBMUD service area after rebate programs and owner-financed replacements,[17] for purposes of this Analysis it is reasonable to compare the replacement potential with neighboring SFPUC data. In 2016, SFPUC estimated that 200,000 inefficient toilets still existed in its service area even after years of aggressive implementation of toilet rebate programs and achieving 75% saturation of efficient toilets for residential connections.[18] The EBMUD service area population is much smaller than SFPUC (about 1.4 million people for EBMUD vs. 2.7 million people for SFPUC), but even conservatively applying half the opportunity, this would still equate to approximately 100,000 inefficient toilets still in use. Moreover, depending on the actual success of EBMUD's historical toilet rebate program, the number of inefficient toilets still in use could be much higher.

D. Program Costs

1. EBMUD Staff Comment: Program costs should be revised. The Draft Memo estimates program costs based on expenditures reported by the SFPUC and the City of Tucson for comparable toilet replacement programs. Two problems are identified with this: (1) it may not be appropriate to assume that costs from a different geographic area would be comparable to costs in the Bay Area, and (2) administrative costs might not be comparable between EBMUD and SFPUC. Additionally, other costs for implementing a new program should be considered, including liability for installation. The Analysis could use the cost benchmarks suggested by EBMUD in the Comment Letter.

2. Tully & Young Response: As accurately noted in the Comment Letter, available cost data from SFPUC, the City of Tucson, and the SAWS were used in the Draft Memo to reasonably estimate

[16] Tucson is estimated to have approximately 48,000 low-income households. https://www.census.gov/quickfacts/tucsoncityarizona

[17] Tully & Young were unable to find readily available reports about toilet rebates and high efficiency toilet saturation in the EBMUD service area. EBMUD staff declined Tully & Young's request for rebate program data.

[18] SFPUC implemented a direct install toilet replacement program to the residents participating in SFPUC's low-income Customer Assistance Program through 2020. It replaced 4,462 inefficient toilets and urinals between 2016-2020. Each toilet accounted for 12,068 gallons in annual savings (~20% savings). Costs included $582 per single family install per toilet, and between $532 and $667 for multi-family install per toilet, with these costs including contractor, administrative and FTE charges.

potential program costs. These programs were selected because they are true toilet replacement programs, not rebate programs, and SFPUC is located in a similar market (the San Francisco Bay Area). Additionally, all three water service providers were cooperative in providing detail and costs basis for their programs. Moreover, the three programs provided a range of costs to help evaluate feasibility.

These costs were represented in the Draft Memo by a cost per toilet that included plumbing contractor and administrative expenditures (FTE and outreach/marketing). While it is acknowledged that different geographic markets have different costs of living, the cost data, which reflects a range of jurisdictions including the very expensive City of San Francisco, provides reasonable benchmarks for the EBMUD service area.

However, in response to EBMUD staff's comments, both refined evaluations in this Analysis use the EBMUD Staff-Suggested Assumptions for administrative program costs. In addition, consistent with EBMUD staff's direction, both refined evaluations include startup costs and program development, as reflected with a "Marketing" line item. Finally, also as requested by EBMUD staff, the suggested annual FTE costs of $300,000 for one Water Conservation Representative is used in both refined evaluations.

Labor costs in both refined evaluations are based on average plumber price quotes for install and removal of a high efficiency toilet in the East Bay Area (i.e., reflect comparatively high cost of living in the Bay Area). The toilet model used is a Niagara Stealth 0.8 GPF Ultra-High-Efficiency currently priced at $129[19] at Home Depot; this model was selected as a reasonable proxy for the likely bulk-purchase of a high-quality toilet.

IV. Graywater Rebate Program

A. Necessary Information

1. EBMUD Staff Comment: The Project team should provide more information about a proposed graywater program. Specifically: what type of system(s) would be funded, and would the systems be installed for new development or to retrofit existing buildings? EBMUD already has a graywater rebate program for retrofits of existing structures.

2. Tully & Young Response: Tully & Young appreciates the opportunity to further expand on the graywater conservation program opportunity. The program model outlined in the Draft Memo, which is based on available data from the City of Tucson, involves mostly "laundry-to-landscape" systems that divert clothes washer water to the landscape instead of the sewer system.

EBMUD's current graywater rebate program offers a rebate of up to $50 for the purchase of a three-way diverter valve, used for the laundry-to-landscape system. Typical laundry to landscape graywater systems are simple designs but require additional materials and labor beyond the three-way diverter valve. In addition, they need PVC pipe and fittings, an "auto vent" or check valve used for air gap, HDPE (high density polyethylene plastic) tubing, valves, and barbed irrigation drips, among other components

[19] Often times, buying in bulk for toilet replacement programs can further reduce costs per toilet. However, $129 per toilet is considered reasonable for purposes of this Analysis.

for more involved designs. Single fixture systems such as the laundry to landscape systems described above do not require permits if there is no connection to the local potable water supply.

At EBMUD direction, Tully & Young is willing to explore other, more involved graywater systems, including integrated systems in new construction. These can include onsite water reuse using recycled graywater for toilet flushing in addition to landscape irrigation. These systems would require city and county specific evaluations as permitting is subject to local authority.

B. Market Potential.

1. EBMUD Staff Comment: The Draft Memo is not clear whether the City of Tucson graywater rebate example covers one or two years. Assuming the same rate of rebates and water savings shown by the City of Tucson, it would take 140 years to achieve 100 AFY in savings. The low participation rate in the Draft Memo program example suggests that funding a higher rebate amount might incentivize increased participation. EBMUD suggests estimating likely participation rates and then how much water could be saved based on those rates.

2. Tully & Young Response: The Tucson rebate program results detailed in the Draft Memo were for a single fiscal year (12 months). Between 2011 and 2019, this program approved 165 rebates, which resulted in cumulative water savings of 27 AF at a total cost of $82,700. At this rate, it would take about 35 years to reach 100 AF in savings, not 140 years. Nevertheless, Tully & Young concurs with EBMUD staff that increasing the rebate amount would likely increase participation and water savings potential. Further analysis in this regard is provided below.

C. Program Costs.

1. EBMUD Staff Comment: EBMUD would like specific information about the type of graywater systems, costs of systems, rebate amounts, permitting requirements, operation and maintenance, in order to better evaluate the program potential. The Draft Memo should not assume costs in a different city would be comparable to costs for the Bay Area.

2. Tully & Young Response: As previously detailed in the Draft Memo, available data from the established Tucson program provides up to $1,000 at 50% of labor and materials costs for graywater systems. The East Bay's Graywater Action organization estimates system materials cost between $150-$300.[20] Labor costs vary, but typically add between $500-$2,000 to the materials cost, depending on the size and complexity of the system. Based on the foregoing, funding up to $1,000 for 50% of the costs of a laundry to landscape system fits within these general Bay Area costs outlined by the local Graywater Action organization. The Draft Memo averages the cost per rebate at $765.35.

[20] https://greywateraction.org/laundry-landscape/

D. Program Savings

1. EBMUD Staff Comment: Different graywater systems provide different savings, and assumptions vary depending on the system and where the water is coming from. It would be helpful to see how the savings estimate is calculated.

2. Tully & Young Response: Tully & Young concur with EBMUD staff that different systems provide different savings, and further elaborate on the anticipated savings methodology as follows. The City of Tucson calculates water savings for its graywater rebate program using a mix of field research and customer consumption analysis. Savings for each program are calculated with the known information about fixture usage and behavior patterns. Annual water savings are calculated by multiplying the number of installations with an average annual savings number. This calculation is done for the expected lifetime of the fixtures, which is based on industry research for fixture devices and has been adopted by conservation organizations such as the Alliance for Water Efficiency[21].

The calculation for determining water savings for each Tucson graywater rebate is 37.2 gpd, or 13, 615 gallons per annum. This savings number is calculated by multiplying the percent end use average of clothes washers (16%) and Tucson's Gallons Per Capita Per Day (GPCD), to get 13.5 gpd. This number is multiplied by the average persons per single-family household (2.76). A similar calculation and program modeling could be made using EBMUD GPCD and household size data, if EBMUD were to provide the data. The refined evaluations below do not include updated analysis for graywater program costs or savings because the leak repair and toilet replacement programs could, on their own, or in combination with each other, achieve the target offset. On its own graywater is not expected provide the amount of savings necessary to achieve the Project's 2:1 offset target.

V. ONSITE WATER REUSE PROJECT

1. EBMUD Staff Comment: The Draft Memo does not estimate costs for an onsite water reuse program. EBMUD recommends using SFPUC's water reuse grant program to develop cost estimates for an onsite water reuse program.

2. Tully & Young Response: Tully & Young recognize that the Draft Memo does not contain cost estimates; instead, it focused on water savings potential supported by examples of successful program implementation.

The SFPUC onsite water reuse grant program applies a qualifying offset quantity to incentivize applicants to implement water reuse, storage, and recycling infrastructure. The economics of the grant program value onsite water reuse at a premium as shown in the table below. It is worth noting that water savings would accumulate annually, thus reducing the cost/AF of the initial grant amount.

[21]Tucson Water Conservation Program FY 2018-2019 Annual Report, and https://www.allianceforwaterefficiency.org/

The Project's refined evaluations below do not include updated analysis for onsite water reuse program costs or savings because the leak repair and toilet replacement programs could, on their own, or in combination with each other, achieve the target offset.

SFPUC Onsite Water Reuse Grant			
Annual Savings (Gallons)	Grant Funding	AF Saved	Cost/AF (first year only)
450,000	$200,000	1.38	$144,822.67
1,000,000	$500,000	3.06	$162,925.50
3,000,000	$1,000,000	9.21	$108,617.00

Section 2 - Water Offset Program Models – Using EBMUD Staff-Suggested Assumptions

As described above, this Analysis presents two refined evaluations in order to ensure a robust feasibility assessment. This Section 2 is the first of these two refined evaluations and uses only EBMUD staff's suggested assumptions to estimate market potential and anticipated water savings. Section 3 below is the second refined evaluation, which incorporates both EBMUD Staff-Suggested Assumptions along with other reasonable assumptions and methodologies as described further herein.

2.1 - Leak Repair Assistance Program (LRA)

This refined evaluation, as reflected in Table 1, projects conservation savings based on EBMUD staff-defined customer accounts pools. Specifically, it assumes:

- The pool of potential participants is limited only to the current CAP-enrolled customer subset of 7,000 households.
- Savings per repair is limited to 1,000 gallons/month.
- Annual costs include FTE and Plumbing Contractor benchmarks provided by EBMUD staff, and Marketing and Insurance Liability[22] placeholder benchmarks. As available sources for a cost-basis for insurance and marketing are limited, it assumes each has a $100,000 annual cost.

Table 1 – Leak Repair Program Model Based on EBMUD Staff-Suggested Assumptions

Limited to 7,000 CAP Enrolled Accounts, 1,000 GPM Per Repair	
Cost and Savings By Percent of Qualified Account Pool	
Plumber Cost Per Repair	$1,500
5% of Pool	
Number of Repairs	350
Estimated Total Repair Cost	$525,000
Water Savings (AFY)	12.89

[22] The Comment Letter asks the Analysis consider risks and liability associated with repairing leaks. "Making repairs to a house line or internal plumbing carries substantial risks, especially in older homes. The (Analysis) cost estimate should not shift risks to EBMUD by assuming all repairs will go smoothly."

15% of Pool	
Number of Repairs	1050
Estimated Total Repair Cost	$1,575,000
Water Savings (AFY)	38.67
25% of Pool	
Number of Repairs	1750
Estimated Total Repair Cost	$2,625,000
Water Savings (AFY)	64.45
35% of Pool	
Number of Repairs	2450
Estimated Total Repair Cost	$3,675,000
Water Savings (AFY)	90.23
66% of Pool[23]	
Number of Repairs	4,617
Estimated Total Repair Cost	$6,925,500
Water Savings (AFY)	170.03

Annual Administrative Costs[24]	
1 Full Time Equivalent Water Conservation Representative	$300,000
Insurance Liability Factor (Assumed – a quote was not obtained)	$100,000
Marketing and Proactive Outreach (Assumed)	$100,000
Total Annual Administrative Cost	$500,000

2.2 - Toilet Replacement Program

This refined evaluation, as reflected in Table 2, projects conservation savings based on EBMUD staff-defined customer accounts and accommodates the "passive" savings deduction methodology outlined in the Comment Letter and addressed in the Tully & Young Responses in Section 1 above. EBMUD staff declined to make actual customer water use available for purposes of this Analysis. Specifically, this evaluation assumes:

- The pool of potential participation is limited only to current CAP-enrolled customer subset of 7,000 households.
- Those households have an average of 1.9 people.
- Savings per toilet is limited to the difference between 1.28 gpf and 0.8 gpf (0.48 gallons) at 12 flushes per day, resulting in 5.76 gallons per day in savings or 3,994.56 gallons per year.
- The toilet model used is a Niagara Stealth 0.8 GPF Ultra-High-Efficiency currently priced at $129.
- Plumbing contractor rates are based on an average price quotes from East Bay Area plumbers of $300 to install and remove a toilet.

[23] Calculated to show the account saturation within the existing CAP households (approx. 7,000), or the number of accounts in the service area, at 1,000 GPM, per repair, needed to reach target offset goal of 170 AFY.

[24] Achieving the offset target may take more than one year. Administrative costs would occur during each year of program activities.

- Annual costs include FTE and Plumbing Contractor benchmarks provided by EBMUD, and Marketing and Insurance Liability placeholder benchmarks.[25]

Table 2 – Toilet Replacement Program Model Based on EBMUD Staff-Suggested Assumptions

Limited to 7,000 CAP Enrolled Accounts, 3,995 GPY, Per Toilet	
Cost and Savings By Percent of Qualified Account Pool	
Cost Per Install (plumber, toilet, removal)	$430
5% of Pool	
Number of Installs	350
Estimated Total Replacement Cost	$150,500
Water Savings (AFY)	4.29
15% of Pool	
Number of Installs	1050
Estimated Total Replacement Cost	$451,500
Water Savings (AFY)	12.87
25% of Pool	
Number of Installs	1,750
Estimated Total Replacement Cost	$752,500
Water Savings (AFY)	21.45
35% of Pool	
Number of Installs	2,450
Estimated Total Replacement Cost	$1,053,500
Water Savings (AFY)	30.03

Annual Administrative Costs[26]	
1 Full Time Equivalent Water Conservation Representative	$300,000
Insurance Liability Factor (Assumed – a quote was not obtained)	$100,000
Marketing and Proactive Outreach (Assumed)	$100,000
Total Annual Administrative Cost	$500,000

Section 3: Water Offset Program Model Using Shared Benchmarks

This Section 3 is the second of two refined evaluations and outlines cost and water savings estimates using the same administrative, marketing, liability, and San Francisco Bay Area adjusted labor cost benchmarks, but employs less-constrained participation levels and actual water savings data from analogous, currently active programs. The assumptions utilized in this Section 3 are considered reasonable as explained more fully herein. Importantly, it is worth noting that pairing a toilet replacement program with a leak repair program would further incentivize program participation and successful conservation offset actions. Accordingly, it is reasonable to conclude that additional savings could be accomplished through the implementation of an innovative water conservation program that incorporates several programs.

[25] The Comment Letter asks the Analysis consider risks and liability associated with toilet replacement: "...installing toilets in older homes raises issues of liability that should be considered."

[26] Achieving the offset target may take more than one year. Administrative costs would occur during each year of program activities.

3.1 - Leak Repair Assistance Program (LRA)

As explained herein, the refined evaluation in Section 2 above potentially underestimates the amount of water savings when compared to results from analogous programs. This could not be quantitatively confirmed because EBMUD staff declined to provide water use data for EBMUD customer accounts; instead, this refined evaluation, as reflected in Table 3, uses a blend of EBMUD program cost benchmarks and existing leak repair program data to model program feasibility. Specifically, it assumes:

- The pool of potential participants consists of 70,000 lower-income households, which is a rounded number based on the households previously identified by EBMUD to qualify for its CAP program.
- Savings per repair is 2,000 gallons/month, which is the low end of 2,000 – 75,000 gallons/month savings reported in 2020 data by the SAWS and Sacramento leak repair programs.
- Annual costs include FTE and Plumbing Contractor benchmarks provided by EBMUD staff, and available Marketing and Insurance Liability placeholder benchmarks.

Table 3 – Leak Repair Program Model Based on EBMUD Staff-Suggested Cost Assumptions and Model Program Data

Open to a Pool of 70,000 DAC Identified Accounts, 2,000 GPM Per Repair	
Cost and Savings By Percent of Account Pool	
Plumber Cost Per Repair	$1,500
1% of Pool	
Number of Repairs	700
Estimated Total Repair Cost	$1,050,000
Water Savings (AFY)	51.56
3% of Pool	
Number of Repairs	2,100
Estimated Total Repair Cost	$3,150,000
Water Savings (AFY)	154.67
5% of Pool	
Number of Repairs	3,500
Estimated Total Repair Cost	$5,250,000
Water Savings (AFY)	257.79

Annual Administrative Costs[27]	
1 Full Time Equivalent Water Conservation Representative	$300,000
Insurance Liability Factor (Assumed – a quote was not obtained)	$100,000
Marketing and Proactive Outreach (Assumed)	$100,000
Total Annual Administrative Cost	$500,000

[27] Achieving the offset target may take more than one year. Administrative costs would occur during each year of program activities.

3.2 - Toilet Replacement Program

This refined evaluation, as reflected in Table 4, uses a blend of EBMUD staff-suggested program cost benchmarks and available data from established toilet replacement programs to model program feasibility. Specifically, it assumes:

- The pool of potential participants consists of 70,000 lower-income households, which is based on the households previously identified by EBMUD to qualify for its CAP program.
- Water savings per toilet are based on empirical data used by SFPUC in their toilet replacement program of 27.8 gallons/day, or 10,147 gallons/year.
- The toilet model used is a Niagara Stealth 0.8 GPF Ultra-High-Efficiency currently priced at $129.
- Plumbing contractor rates are based on an average price quotes from East Bay Area plumbers of $300 to install and remove a toilet.
- Annual costs include very conservative FTE and Plumbing Contractor benchmarks provided by EBMUD staff, and Marketing and Insurance Liability placeholder benchmarks.

Table 4 – Toilet Replacement Program Based on EBMUD Staff-Suggested Cost Assumptions and Model Program Data

Open to a pool of 70,000 DAC Identified Accounts, 10,147 GPY, Per Toilet	
Cost and Savings By Percent of Account Pool	
Cost Per Install (plumber, toilet, removal)	$430
1% of Pool	
Number of Installs	700
Estimated Total Replacement Cost	$301,000
Water Savings (AFY)	21.80
3% of Pool	
Number of Installs	2,100
Estimated Total Replacement Cost	$903,000
Water Savings (AFY)	65.39
5% of Pool	
Number of Installs	3,500
Estimated Total Replacement Cost	$1,505,000
Water Savings (AFY)	108.99
10% of Pool	
Number of Installs	7,000
Estimated Total Replacement Cost	$3,010,000
Water Savings (AFY)	217.98

Annual Administrative Costs[28]	
1 Full Time Equivalent Water Conservation Representative	$300,000
Insurance Liability Factor (Assumed – a quote was not obtained)	$100,000
Marketing and Proactive Outreach (Assumed)	$100,000
Total Annual Administrative Cost	$500,000

[28] Achieving the offset target may take more than one year. Administrative costs would occur during each year of program activities.

EAST BAY MUNICIPAL UTILITY DISTRICT

Alice Towey
MANAGER OF WATER CONSERVATION

March 15, 2021

John Kopchik
Director,
Department of Conservation and Development
Contra Costa County
30 Muir Road
Martinez, CA 94553

Dear Mr. Kopchik,

East Bay Municipal Utility District (EBMUD) appreciates the opportunity to provide comments on the February 24, 2021 preliminary draft memorandum prepared by Tully and Young on behalf of the Tassajara Parks (Project) developer, entitled "Tassajara Park Water Conservation Opportunities Analysis Results" (Draft Memo).

First, I wish to thank the Project team for hearing EBMUD's concerns about the importance of conducting a thorough evaluation of the feasibility of conservation offsets, and I appreciate that the Project team has prepared the Draft Memo to help address those concerns. I also appreciate that the Team considered the potential conservation projects EBMUD suggested and which are evaluated in the Draft Memo. As a reminder, these projects were examples of the types of projects that EBMUD has not yet committed to, and we encouraged the Project Team to consider other projects it believes merit evaluation.

In reviewing the Draft Memo, my goal was to ensure that its analysis does not pass potential water supply-related risks and costs on to EBMUD and its customers. As we discussed in our meetings, EBMUD's long term water supply plans – including its conservation program – are designed to meet existing and future demand within EBMUD's Ultimate Service Boundary (USB). [1] Due to the Project's location outside the USB, if EBMUD were to serve the Project, the developer would be required to provide a suitable source of water supply to adequately offset the Project's demand, to EBMUD's satisfaction. The Draft Memo considers the costs of creating "new water" to offset the Project's demand through implementation of developer-funded offsite conservation measures. I have reviewed the Draft Memo with an eye toward identifying analysis and assumptions that could shift the Project's water supply-related risk and costs to EBMUD and

[1] The Ultimate Service Boundary defines the territory within which EBMUD has planned to provide water service.

its customers. With this context in mind, I have prepared the following comments on the Draft Memo.

Global Comments

Global Comment #1: Conservation Offset Target

Project water demand estimates cited in various versions of the EIR have ranged from 40 AFY to 56.3 AFY, while EBMUD's water demand estimate for the Project is approximately 85 AFY. Acknowledging the disparity in demand estimates and EBMUD's discretion to ultimately determine the estimated demand to be offset by the developer, the Final EIR stated that the County would require the Developer "to enter into a binding agreement with EBMUD that provides for the Project to fully accommodate its identified demand at a minimum of 56.3 AFY or the amount ultimately confirmed by EBMUD, whichever is greater." (Final EIR at p. 2-5.)

For annexations outside EBMUD's (USB), offsite conservation-based water demand mitigation fees have typically been based on a mitigation ratio of at least 2:1. For example, for the Alamo Creek development which the County sometimes refers to as an exemplar for the Project, the County conditioned its project approvals on the developer's payment to EBMUD of water demand mitigation fees at a ratio of 2:1 (i.e., two gallons saved for every one gallon of estimated demand). Given this historical precedent, Tully and Young's analysis should be revised to consider the feasibility of achieving at least 170 AFY in conservation savings--twice EBMUD's water demand estimate for the Project—rather than the 100 AFY conservation target used in the Draft Memo.

Global Comment #2: Consideration of Conservation Program Market Potential

Water conservation program feasibility analysis should address both the potential costs of the programs in question, and their market potential, or the likely number of eligible customers who would actually participate in the program. Analyzing market potential is necessary to determine the amount of potential water savings that could be achieved through a proposed conservation program.

The Draft Memo does not appear to address market potential for the conservation programs it considers. Instead, it appears to have back-calculated the number of program participants necessary to reach 100 AFY of water savings, and assumes it would be possible to enroll that number of participants in each program. This means the Draft Memo concludes adequate conservation savings could be fully achieved through implementation of relatively new programs that have not been tested in EBMUD's service area, based on non-conservative assumptions regarding program participation rates and water savings. However, if implementation does not ultimately match these projections, the Project's water supply-related risk and costs would be shifted to EBMUD, as it likely would be required to implement other, potentially more expensive programs to generate the required water savings to offset the Project's demand.

Below, I provide more specific comments on market potential analysis for each program considered in the Draft Memo, and those comments are aimed at helping Tully and Young identify parameters it should consider in its analysis of market potential.

Leak Repair Assistance Program Comments

The Draft Memo focuses much of its attention on the costs of achieving 100 AFY in conservation savings through a developer-funded leak repair assistance program that would pay the costs of leak repair for low-income customers enrolled in EBMUD's Customer Assistance Program (CAP). The Draft Memo assumes that 100 AFY in conservation savings could be achieved by fixing 1,350 leaks, with each leak fix resulting in an average of 24,000 gallons per year in water savings. In its next draft, Tully and Young should address the following comments.

Leak Repair Program Comment # 1: Crediting Achieved Water Savings to the Program

The Draft Memo estimates the costs of generating 100 AFY in conservation savings by crediting the program for all water savings resulting from program-funded leak repairs. By doing so, the Draft Memo's analysis assumes that none of the program-funded leak repairs would have occurred in the absence of the program.

To create "new water" to offset the Project's demand, the Project developer should only be credited for leak repairs that would not have occurred without program funding. While the repair rate might be somewhat lower among CAP customers due to potential financial barriers, the analysis should not assume no program-funded leak repairs would have occurred in the absence of the program.

Leak Repair Program Comment #2: Considering Market Potential

The Draft Memo assumes that 1,350 leak repairs would be completed at the residences of CAP-enrolled customers, and that each leak repair would result in an average of roughly 24,000 gallons per year in savings per leak. During our conservations with the Project Team, we explained that in recent years CAP enrollment has ranged from approximately 6,000 to 8,300 households. Thus, by assuming 1,350 leak repairs would occur, the Draft Memo assumes that roughly 17-23 percent of all CAP-enrolled customers (1) are experiencing a leak resulting in an average of 24,000 gallons per year of water loss, and (2) could be identified and would choose to participate in a leak repair program. The basis for this assumption is unclear.

The Draft Memo underestimates the difficulty of identifying and incentivizing participation from an adequate number of CAP-enrolled customers to achieve enough water savings through leak repair to sufficiently offset Project demand. EBMUD does not have advanced metering infrastructure (AMI)—or "smart metering"—available to track real-time water use and thus easily identify leaks. Without AMI, it would be very difficult, more expensive, and would require more expertise and outreach to identify and incentivize participation from a sufficient

number of CAP-enrolled customers to achieve the Draft Memo's assumed leak repair program water savings.

In addition, EBMUD has historically encountered challenges in expanding participation in its CAP program. Typical participation in CAP ranges from 6,000 to 8,000 households at any given time, but EBMUD estimates that as many as 69,000 households could be eligible. This is a common issue with water rate assistance programs, as documented in a recent report by SPUR.[2] Potential barriers to enrollment could include language issues, fear or mistrust of government agencies, difficult applications, or lack of awareness of the programs. It is likely that a leak repair assistance program would face similar barriers to participation, which should be considered in the analysis of market potential.

The SPUR report outlines the challenges EBMUD and other agencies have faced in increasing enrollment in customer assistance programs. Given these challenges, the analysis also should not assume that low income customers not currently enrolled in CAP could be easily recruited for participation in the proposed leak repair program. For that reason, to ensure the Project's water supply-related risks are not shifted to EBMUD, the cost estimate for offsetting the Project's water demand should not be based on implementing income-based programs that rely on recruiting participation from low income customers outside the CAP program. I therefore recommend that the analysis focus on leak repair program market potential among CAP-enrolled customers, without assuming CAP program expansion beyond its current size. The next draft of the Memo should acknowledge the limitations on market potential, and should estimate leak repair program savings potential with those factors in mind.

My recommendations are based upon the importance of ensuring the Project's water supply-related risk is not shifted to EBMUD. While EBMUD is considering implementation of these types of programs to assist low income customers and generate water conservation savings, we are not comfortable assuming that a large proportion of the water savings needed for the Project could be achieved by implementing a relatively new concept for which there is no analog in the District's service area. If program implementation did not meet the Draft Memo's assumptions, the Project's water supply-related risk and costs would be shifted to EBMUD, as it likely would be required to implement other, potentially more expensive programs to generate the required water savings to offset the Project's demand.

Leak Repair Program Comment # 3: Program Cost Estimates

The Memo estimates the costs for the leak repair program based on costs per acre foot derived from a leak repair program implemented by San Antonio Water System. This methodology for calculating costs is imprecise, and as discussed below, I recommend preparing a cost estimate reflecting local cost factors.

---

[2] spur_keeping_the_water_on.pdf

First, the cost to repair a leak can vary significantly depending on the type and location of the leak. It is unclear what types of leaks the San Antonio program repairs and whether those leaks would be similar to the types of leaks that would be included in an EBMUD program.

Furthermore, the San Antonio program expenditures from 2020 represent the operating costs for a program that has been in existence since 1994. The costs to develop a new program "from scratch" are typically much higher than the annual operating costs for an established program. It is also not clear what costs are included in the San Antonio program expenditures listed in Table 1 of the Draft Memo; without this information, it is difficult to determine if these expenditures are representative of the costs that EBMUD would face for developing a program locally.

It appears the cost estimate also assumes that costs for San Antonio would be comparable to costs for the San Francisco Bay Area, which has a notably high cost of living. The Draft Memo proposes doubling the costs for the San Antonio program, but it is unclear if that is sufficient. Using this methodology, the memo assumes an average cost per leak repair of roughly $900. Based on EBMUD's experience with the relatively simple task of installing pressure regulators on a customer's premises,[3] $900 would not cover the costs of hiring a plumber to complete the leak repair, or the costs associated with leak repair program development and administration. When EBMUD contracts for pressure regulator installation, it typically pays plumbers between $1,000 and $1,500 per installation, and some installations cost well over $50,000 due to problems encountered on the job site.

The Memo should also consider the risks and liability associated with repairing leaks, which can vary significantly depending on how extensive a repair is required and where it is located. For example, making repairs to a house line or internal plumbing carries substantial risks, especially in older homes. The Memo's cost estimate should not shift risks to EBMUD by assuming all repairs will go smoothly.

Rather than developing a cost estimate based on San Antonio's costs, I recommend estimating costs for developing the proposed program from the ground up, taking into account estimated costs for contractors, insurance requirements, EBMUD staff time to develop and administer the program, and other associated expenses. Here are a few relevant benchmarks that should be used to develop a cost estimate for the program:

Factor	**Cost**
EBMUD labor costs, 1 full time equivalent Water Conservation Representative (include	$300,000 per year

[3] Pressure regulators are typically installed above ground, near a hose bib on the outside of the customer's house.

fringe and overhead)	
Plumber Contractor Costs[4] for pressure regulator installation	$1,500 per leak repair

Direct Install Toilet Replacement Program Comments

The Draft Memo estimates the costs of achieving 100 AFY in conservation savings through a developer-funded direct install toilet replacement program that would pay the costs of installing high efficiency toilets for CAP-enrolled customers. The Draft Memo assumes that 100 AFY in conservation savings could be achieved by installing approximately 2,700 to 3,800 high efficiency toilets, resulting in approximately 8,600 to 12,000 gallons per year in water savings per toilet. In its next draft of the Memo, Tully and Young should address the following comments.

Toilet Replacement Program Comment # 1: Crediting Achieved Water Savings to the Program

The Draft Memo estimates the costs of generating 100 AFY in conservation savings through direct installation of high efficiency toilets by crediting the program for all water savings resulting from program-funded toilet installations. The Draft Memo does not clarify the extent to which savings would result from program-funded installation of toilets meeting current code requirements. EBMUD's water conservation forecasts, which play a key role in meeting future demand within the USB, assume the achievement of "passive" conservation savings through the eventual replacement of older fixtures such as toilets with newer, more water efficient fixtures meeting current Plumbing Code requirements. As a result, developer-funded installation of 1.28 gallons per flush (gpf) toilets would only result in matching conservation forecast assumptions necessary to meet demand within the USB and would not create "new water" for the Project. To receive credit for achieving conservation savings EBMUD has not already assumed will occur to meet demand within the USB, the program would be required to install toilets more efficient than 1.28 gpf,[5] and "new water" attributable to the program would be calculated based on the difference between demand for a 1.28 gpf toilet and the gpf rating for each toilet installed through the program.

Toilet Replacement Program Comment # 2: Water Savings per Toilet Installed

[4] This reflects the upper range of typical costs of pressure regulator installation, a relatively simple, straight forward task for a plumber. As explained above, costs can substantially exceed $1,500 per installation.

[5] The Plumbing Code currently requires new toilets to be rated at 1.28 gpf or less.

The Draft Memo assumes savings of approximately 22-33 GPD per toilet installation. It would be helpful to review the information underlying this assumption, such as the assumed number of flushes per day or the gpf rating of either the replaced toilet or the newly installed toilet. Given that the average household size for CAP-enrolled customers is 1.9, and that the average American flushes the toilet five times per day, to achieve 22-33 GPD in savings, the toilet replacement program would be required to achieve average savings per flush of 2.2 to 3.3 gpf. As discussed above, the Project can only claim credit for water savings resulting from installation of toilets more efficient than the current code requirement of 1.28 gpf. Assuming 0.8 gpf toilets were installed through the program, and that the toilets are flushed twelve times per day on average, this would equate to 6 gpd of savings per toilet.

Toilet Replacement Program Comment #3: Market Potential

The Draft Memo assumes approximately 2,700 to 3,800 old, inefficient toilets in the homes of CAP-enrolled customers would be replaced with new, high efficiency toilets. However, as noted above, in recent years CAP enrollment has ranged from approximately 6,000 to 8,300 households. I do not believe it is likely that 33-64% of CAP-enrolled customers (1) live in homes with old, inefficient toilets, and (2) could be identified and would choose to participate in a toilet replacement program.

As noted above for the leak repair program, for a program like this one that would be targeted at EBMUD's CAP-enrolled customers, the Draft Memo should account for the known size of the CAP Program. As with the leak repair program, the Memo's analysis of the toilet replacement program should first estimate the number of toilet replacements that could feasibly be completed among CAP-enrolled customers, and then estimate how much water could be saved based upon that level of participation.

Toilet Replacement Program Comment #4: Program Costs

The Draft Memo estimates the program cost by calculating the cost per toilet replaced, based on expenditures reported by San Francisco and the City of Tucson. As discussed above for the leak repair program, it may not be appropriate to assume that costs from a different geographic area would be comparable to costs in the Bay Area. It is also not clear whether the administrative costs for an EBMUD program would be comparable to the costs to operate the program in San Francisco, which has unique features related to its joint status as a water utility, City, and County.

To further assess the accuracy of these costs, it would be helpful to have more details; specifically, it is unclear which type of toilet the cited programs install. As discussed above, to claim credit for creating "new" conservation, the Project developer would need to fund installation of toilets that are more efficient than the 1.28 gpf currently required by code.

As discussed for the leak repair program, the cost for developing a new program should include startup costs and program development. The Draft Memo should also account for potential risk to EBMUD; installing toilets in older homes raises issues of liability that should be considered.

The Draft Memo should be revised to estimate costs for developing a new program in EBMUD's service area, taking into consideration that initially administrative costs will likely be much higher. The costs provided in the table above may also be helpful to developing cost estimates for a toilet direct install program.

Graywater Rebate Program Comments

The Draft Memo estimates the costs of achieving 100 AFY in conservation savings through a developer-funded graywater system rebate program. Based on information regarding Tucson's graywater rebate program, the Draft Memo assumes that 100 AFY in conservation savings could be achieved through rebates resulting in installation of approximately 2,380 graywater systems, with each system achieving approximately 13,615 gallons per year in water savings. In its next draft of the Memo, Tully and Young should address the following comments.

Graywater Rebate Program Comment #1: Necessary Information

It would help to provide additional detail regarding the type of graywater rebate program the Project Team envisions. The next draft of the Memo should provide information addressing the following questions:

- What kind of graywater system(s) does the memo assume would be funded through the rebate program? This information is necessary to evaluate the Memo's cost estimates.

- Does the memo assume rebate-funded systems would be installed for new development, or to retrofit existing buildings? This information is necessary to ensure the program would fund conservation EBMUD has not already committed to implement to meet demand within the USB. (EBMUD already implements a graywater rebate program for retrofits of existing structures.)

Graywater Rebate Program Comment #2: Market Potential

The Draft Memo states that Tucson approved 17 graywater rebates in FY 2018-19. It is not clear whether that estimate covers two years, or only one. Assuming rebates were awarded at a rate of 17 per year, it would take 140 years to achieve 100 AFY in savings. As a practical matter, that would make a graywater rebate program infeasible because its ability to achieve sufficient conservation to offset Project demand would be highly uncertain. The low participation rate also suggests a 50% rebate would not sufficiently incentivize participation to achieve the level of water savings necessary to offset Project demand. The Draft Memo should consider funding higher rebate amounts in order to achieve increased levels of participation.

The next draft of the Memo should also consider whether 2,380 EBMUD customers could be incentivized to participate in a graywater rebate program. As with the programs addressed above, analysis of the graywater rebate program should first estimate likely participation rates, and then estimate how much water could be saved based upon that level of participation.

Graywater Rebate Program Comment #3: Program Costs

It would be helpful if the next draft of the Memo included information regarding the type of graywater system(s) that formed the basis for the graywater rebate program cost estimate. That information will make it possible to assess the accuracy of the estimate. In addition, as mentioned previously, the next draft of the Memo should not assume costs for a different city – in this case, Tucson – would be comparable to costs for the Bay Area.

Table 5 in the Draft Memo suggests a cost of $765.35 per gray water system including administrative costs; however, the preceding discussion seems to suggest that this cost is just for the rebates themselves. The Draft Memo should be revised to provide greater detail and granularity on the program cost estimate. And as referenced above, subsequent drafts of the Memo should consider larger rebates to incentivize increased customer participation.

Depending on the type of graywater systems installed, the administration costs could be higher, as some systems require permits. Costs for such programs would have to factor in the permitting process. In addition, a program based on more complex graywater systems could require extensive outreach and training on system installation, operation, and maintenance.

Graywater Rebate Program Comment #4: Program Savings

In future drafts of the Memo, it would help to see the types of graywater systems that are envisioned and how the savings estimate is calculated. Savings from graywater systems can vary depending on where the water is coming from and how it is being used. For example, EBMUD offers a rebate for "laundry to landscape" graywater projects, and the projected amount of water savings depends in part on how water efficient a customer's washing machine is; with an older, inefficient top loader, savings could be 11,200 gallons per year, while with a more efficient front loader the savings are only 3,600 gallons per year.

Rainwater Catchment Program

Given the Draft Memo's low estimate of potential savings for this program, it does not appear to be worth pursuing any further.

Onsite Water Reuse Program

The Draft Memo discusses but does not estimate costs for an onsite water reuse program. During our conversation in December 2020, I referenced the San Francisco Public Utilities Commission's onsite water reuse grant program. I recommend that Tully & Young use information regarding that program to develop onsite water reuse program cost estimates. Given the concerns regarding market potential for the other conservation programs addressed in the Draft Memo, and other issues noted above regarding the Draft Memo's conservation target, subsequent drafts should provide cost estimates for a suite of conservation programs that includes an onsite water reuse program.

To close, I would like to again thank the Project Team for embarking on the feasibility assessment that EBMUD requires. I appreciate the chance to review the Draft Memo. While the comments in this letter touch on many issues, they are offered in the spirit of cooperation and with the goal of helping the Project Team to better understand EBMUD's requirements and concerns. The EBMUD team is happy to answer any questions on these comments. I look forward to speaking with you in the future.

Regards,

Alice F. Towey

Alice Towey

AET: by

Tully & Young
Comprehensive Water Planning

965 University Avenue, Suite 222
Sacramento, California 95825
(916) 669-9356

WHITE PAPER

To: Contra Costa County Department of Conservation and Development

Date: February 24, 2021

From: Galen Davis
Greg Young

Subject: Tassajara Park Water Conservation Opportunities Analysis Results

---

This Memorandum describes results from a Water Conservation Opportunities Analysis (Analysis) done by Tully & Young, Inc., a Comprehensive Water Planning firm, to estimate the costs for implementing the water-demand offset approach described and analyzed in the Tassajara Parks Project (Project) EIR (SCH No. 2014052089).

The Analysis focuses on the water conservation opportunities identified by East Bay Municipal Utility District (EBMUD) in its presentation titled "EBMUD Water Conservation Program Overview and Uncommitted Projects," which EBMUD staff discussed with Project representatives on December 21, 2020 to elaborate on conservation offset measures available to EBMUD. Pursuant to direction from staff and the Project representatives, Tully & Young analyzed the following opportunities for financial feasibility to further document and confirm the ability of the Project to offset its forecast water demand, as described and analyzed in the EIR, and to demonstrate no increased costs to EBMUD's other existing and future customers.

These and other opportunities were identified by EBMUD in the EBMUD Water Supply Management Program 2040 (WSMP 2040) report, Appendix D TM-5 Conservation Program Evaluation TM (Appendix D)[1]:

- Graywater
- Rainwater Catchment
- Onsite Water Re-use
- Leak Repair Assistance Programs
- Direct Install High-Efficiency Toilet / Fixture Replacement Programs

[1] As explained in more detail in the Project's EIR, Appendix D is a technical analysis that identifies and evaluates conservation measures that could be implemented by EBMUD to reduce future water demand and estimates the costs and water savings of those measures.

The Analysis incorporates program detail and data from Appendix D.

The Analysis also incorporates data collected from several other water suppliers' conservation programs in the State of California and around arid regions in the southwestern United States. These include: San Antonio Water Service (SAWS), City of Sacramento, San Francisco Public Utilities Commission (SFPUC), City of Tucson Water, and Marin Municipal Water District (MMWD), among others.

The goal of this Analysis is to further document and confirm the financial feasibility of water conservation programs and efforts that EBMUD can employ to offset water demand generated by the Project, making it water neutral.

For purposes of this Analysis, a presumed Conservation Offset Target (Target) is set at 100,000 Gallons Per Day (GPD), or 0.1 Million Gallons Per Day (MGD), or about 100 acre-feet per year. This is a conservative placeholder, as the final offset requirements for the Project would be determined ultimately by EBMUD's Board of Directors. The results of this Analysis are expressed in dollars per acre-foot of potable water saved in a way that is durable and will continue, so the Target can be scaled up or down as appropriate to ensure the Project's potable water demand at buildout is fully offset with a margin of safety.

Findings

While there are several programs that are financially feasible for implementation to achieve real and durable water savings, this Analysis focuses conservatively on the most efficient options to achieve the Target.

As discussed in the Project EIR, and as confirmed in this memorandum, achieving the Target for the Project is readily achievable with conservation-based offsets that are durable and feasible for the Project to fund.

Leak Repair Assistance Program

On average, 14 percent of total residential indoor water use in the United States can be attributed to undetected leaks,[2] and after evaluating the aforementioned programs, the Leak Repair Assistance ("LRA") program emerged as the strongest conservation approach for many reasons. In layman's terms, a LRA program provides water leak repair services and other water use efficiency improvements to low income or disadvantaged community (DAC) households free of charge to the customer, thus remediating system water loss for the utility without any additional financial burden for the household. DAC households are less likely to fix leaks or make other water use efficiency improvements because of the relatively high cost of plumbing services and high cost of replacement fixtures and appliances, which means water loss and higher water bills persist in a wasteful cycle.

A LRA program would complement EBMUD's already impressive water conservation efforts, supplementing existing conservation measures outlined in WSMP 2040 Appendix D, Program D. LRA

[2] 2016 Water Research Foundation's Residential End Uses of Water, Version 2

water conservation programs, while still a leading-edge approach nationwide, have a proven history of success in meeting or exceeding conservation goals in other water utility service areas. Comparative analysis of two established LRA programs is included in this Analysis.

One of the necessary mandates for the Project's water offset is the requirement to identify durable water savings—water savings that are reliable, quantifiable and lasting. LRA programs meet these criteria because leak fixes are in most cases permanent, resulting in significant and measurable cumulative water savings. This permanence is equivalent to the same benefits water suppliers expect from other water conservation programs, such as toilet rebate programs.

Another important aspect to consider for implementation is effective program targeting. The ability to target a conservation program greatly influences the success of the program and LRA programs are naturally targeted. EBMUD's Customer Assistance Program (CAP) has a head start identifying qualified accounts, and California's Department of Finance (DoF) and Department of Water Resources (DWR) have DAC maps and demographic data that are useful in DAC identification. EBMUD's expanding use of Advanced Metering Infrastructure (AMI)—sometimes referred to as "smart meters"—enables EBMUD to accurately identify excessive water use by individual customers and to quantify water savings from leak repairs, toilet replacement or other measures at the metered account level. Other effective targeting methods include proactive outreach and water use monitoring by customer groups defined by demographic characteristics specified by the water supplier.

Finally, LRA programs are not just an effective and durable water conservation tool. They are programs that reflect important social justice goals by serving and benefitting ratepayers that truly need the financial assistance. Pairing LRA with the CAP program shows commitment to disadvantaged individual households and communities in the EBMUD service area. Providing emergency plumbing repair assistance to low income residents can also stop the cycle of water service disconnection that can occur if the household cannot afford either the plumbing repair or the high cost of continued water wasted from leaks. LRA is a water conservation tool and a positive social program in one.

San Antonio Water Service (SAWS) "Plumbers to People"

In 1994, SAWS introduced its first water conservation program called Plumbers to People (PTP). Almost two decades later it is still their flagship program providing both socioeconomic assistance and effectively decreasing wasted potable water in their service area. The long running program also has the benefit of years of data to draw on to inform program cost and savings metrics. PTP has been effective not just with leak detection and repair; while on leak fix calls SAWS has been able to deploy other conservation efforts such as toilet and fixture replacements to increase saturation of those programs.

SAWS' conservation director, Ms. Karen Guz, has offered to provide additional data from the long-standing PTP program, if helpful. SAWS recently completed its 5-year conservation plan describing their extensive conservation programs, including PTP. The plan is available here:

https://apps.saws.org/conservation/plan/docs/Conservation%20Plan_Draft_20201215.pdf

PTP Qualification:

- Uplift Program participants (similar to CAP); 30,000 households enrolled in Uplift.
- Household must be documented as falling within 125% of federal poverty guidelines.
- Account holder must own and reside in the home.
- Must be potable water leak.

PTP Targeting:

- Outreach: mail, email, social media, news media, direct contact.
- Program management platform: automated data compilation and customer communication.
- Monthly cohort water use monitoring: When use is 150% higher than expected for a typical household, customer is contacted. When customer responds they are offered plumbing assistance. When plumber is deployed, 85% of households are confirmed to have a leak.

PTP Costs and Water Savings:

The PTP program is a mainstay of the SAWS conservation program with substantial, increasing durable water savings returns. As targeting and technology have improved (such as account data management and monitoring), SAWS has been able to reach more households and increase their annual customer reach and durable water savings.

Table 1 shows the 2020 program expenditure for Plumbers to People and the associated water savings. The savings assumes 2,000 gallons per month, which is the lowest and most conservative end of the durable water savings range documented by SAWS.[3] Program expenditure includes administrative and associated Full Time Employee (FTE) costs. It should be noted that SAWS continues to achieve this level of program success in expanding durable water savings even after 20 years.

Table 1 – 2020 Plumbers to People Cost and Water Savings

Program Expenditure	$586,782
Site Fixes	1,328
Average Cost Per Fix	$442
Cost Per Acre-foot[4]	~ $6,000
Gallons Saved Per Fix	~ 24,000 gallons/year ~ 2,000 gallons/month
Gallons Saved	31,872,000
Acre-feet saved	97.8

[3] SAWS provided water savings assumptions between 2,000 – 4,000 gallons per month per site.

[4] For every $6,000 spent on PTP implementation, at least 1 acre-foot of potable water is saved every year following completion of the leak repair or other water conservation measure that is implemented.

City of Sacramento "Leak Free Sacramento"

The City of Sacramento (City) rolled out their LRA program, "Leak Free Sacramento" (LFS), in September of 2016 after receiving a Water and Energy grant from DWR. Similar to the SAWS program, LFS targets low-income and single-family homeowners living in homes located in disadvantaged communities. The initial program period lasted for one year ending in September 2017. After evaluating the year-long trial, the program was deemed a success for achieving durable water use reductions that benefit disadvantaged communities, so they continued the program starting in May 2018. The City modeled their program on the SAWS PTP program as a no-cost direct leak repair program for both indoor and outdoor leaks. The initial 2016-17 program targeted the top 25% of their service area's DAC and expanded in 2018 to target the top 40%. The City is prioritizing fixes based on leak size, financial impact, and safety. AMI is deployed to 98% of their residential connections which allows for very effective targeting. They have found leaks from 7 gallons per hour (gph) to the staggering rate of 865 gph.

LFS Qualification:

- Income-eligible or a current participant of Sacramento Utility Rate Assistance program (similar to CAP).
- Must live in DAC in top 40% of CalEnviroScreen 3.0 score.
- Single Family Residential homeowners only.
- (Future) Adding eligibility for low income customers not in DAC areas.

LFS Targeting:

- AMI monitoring for higher than expected water use.
- Pattern of a minimum of 6 gph, 24 hours per day, for 5 consecutive days.
- Outreach: Newsletters, email, social media. March is "Fix a Leak Month".
- Leak investigation referrals, leak letters.

LFS Costs and Water Savings:

The City of Sacramento initiated its LFS program in 2016 with a DWR grant and has expanded LFS into a multi-year program to accomplish expanding, durable water use reduction. Full AMI deployment will help with efficient spending and targeted water savings.

Table 2 shows program expenditure and associated water savings for Leak Free Sacramento. Water savings are based on AMI data. Program expenditure includes administrative, contractor, and associated FTE costs. The 2020 figures primarily represent outdoor repairs due to COVID restrictions against indoor fixes. These tend to be more expensive jobs (service laterals, excavation, etc.), but often fix larger leaks leading to more savings.

A unique attribute of this program operated by a public utility in California is that funding of a targeted program must be derived from non-rate-based revenue sources. The City is currently funding its program with, among other sources, revenue received from recent temporary water transfers (e.g. the City sold water to several State Water Contractors in 2018 and 2020 as part of approved groundwater substitution transfers).

Table 2 – 2020 Leak Free Sacramento Cost and Water Savings

Program Expenditure	$60,680.00
Site Fixes	25
Average Cost Per Fix	$2,427.20
Cost Per Acre-foot[5]	$848.84
Gallons Saved Per Fix	~ 930,000 gallons/year ~ 75,000 gallons/month
Total Gallons Saved	23,293,716
Total Acre-feet saved	71.49

EBMUD Leak Repair Assistance Program

Launching a Leak Repair Assistance program in the EBMUD service area is an exciting prospect to bring real water savings to EBMUD and valuable assistance to its low-income residents. The growing CAP cohort is a natural qualifier and the LRA program could even encourage CAP enrollment if it were part of the qualification for assistance as it is with Leak Free Sacramento. LRA can also enhance other Appendix D program saturation, specifically toilet and fixture replacement, ensuring additional water savings with installation follow-through during the leak fix visit.

Projected EBMUD LRA Costs and Water Savings:

By taking the cost data from SAWS and the City of Sacramento, a reliable cost and water savings comparison can be made for a similar LRA program in the EBMUD service area. First, it is important to note that in California Propositions 218 and 26 guide the use of rates and fees for services. Therefore, getting a program like LRA, which is targeted to the low-income segment of the population, requires special attention to the source of funding for the program. As noted previously, Sacramento got their program running with a grant from DWR and has since found other sources of funding within their budget for the program.

Conceptually, the Project could jump-start a LRA program within EBMUD through special Project funding associated with offsetting the Project's water needs. The resulting water savings from fixing leaks, replacing old, inefficient toilets and fixtures, and similar measures would be durable and lasting because they do not depend on customers changing their water-use behavior.

Table 3 shows a proposed annual budget and associated water savings using the conservatively low cumulative monthly water savings of 2,000 per fix per month. The values in the table are based on a very conservative assumption of twice the per-acre-foot cost shown for the SAWS program (see Table 1) – setting the cost at $12,000 per acre-foot. To achieve the Target of approximately 100 acre-feet, the LRA program would require a total budget of $1,200,000. Spreading the program over three years – or a

[5] For every $849 spent on LFS implementation, at least 1 acre-foot of potable water is saved every year following completion of the leak repair or other water conservation measure that is implemented.

budget of $400,000 per year – could durably achieve the annual Target of approximately 100 AF by the end of the third year (at an incremental increase of 33 AF per year). Once each fix is made for each customer, the prior waste would be permanently removed.

Table 3 – Proposed EBMUD Leak Repair Assistance Program Annual Budget and Water Savings

Annual Program Expenditure	$400,000
Annual Site Fixes	450
Average Cost Per Fix	~ $900
Cost Per Acre-foot[6]	$12,000
Gallons Saved Per Fix	~ 24,000 gallons/year ~ 2,000 gallons/month
Annual Gallons Saved	~ 10,800,000
Annual Acre-feet saved	~ 33

Additional Water Offset Options

In the meeting on January 12, 2021 with the District and the Project applicant team, Tully & Young highlighted several other uncommitted water conservation program options identified by EBMUD as having feasibility to obtain the Target for the Project. With effective deployment and saturation, these conservation options could be used individually or in combination with each other (and an LRA program) for additional water savings. This section describes those findings and further program information and data.

Direct Install Toilet Replacement Program

Similar to the LRA program, some water utilities run successful toilet replacement programs for low income populations in their service areas in both single-family residential and multi-family residential housing. These programs are more effective than toilet rebates because the entire cost of the high-efficiency toilet is covered. This becomes an approach to overcome challenges when households cannot or will not cover the relatively high toilet-replacement cost not covered by the rebate, thus increasing program saturation and durable water savings.

SFPUC Direct Install Toilet Replacement:

After running multi-year toilet rebate programs, SFPUC reported 75% Single-Family Residential and 76% Multi-Family Residential saturation of efficient toilets in 2015. Still, SFPUC recognized about 200,000 inefficient toilets still in service. They committed to a direct install toilet replacement program to the

[6] For every $12,000 spent on LRA program implementation, at least 1 acre-foot of potable water is saved every year following completion of the leak repair or other water conservation measure that is implemented.

residents in their low-income Customer Assistance Program through 2020. This program became the Plumbing Fixture Replacement Program (PREP).

- Between 2010 and to date, SFPUC has replaced approximately 12,956 toilets in residential and commercial properties through two separate direct install programs.
- FY 2019-2020, 574 efficient toilets were installed through the PREP program, bringing the overall program total to 4,462 efficient toilets and urinals since the program launched in 2016. Each toilet = 12,068 gallons annual savings (20% savings).
- Cost per toilet replacement in current direct install program is $375 per toilet, including labor for installation.[7]

San Antonio Water Service Toilet Replacement Program:

After achieving similarly high saturation numbers for replacing inefficient toilets in their service area through rebate programs, SAWS incorporated toilet distribution programs. While visiting the low-income customers through the PTP programs the plumber would check the toilet. Where inefficient toilets were found, new toilets were installed and old toilets removed, resulting in even higher saturation and allowing them to completely phase out dedicated toilet replacement programs. That phase-out demonstrates the durability of the water use reduction achieved from toilet replacement. Since 1994, SAWS has replaced over 300,000 inefficient toilets in their service area. They still replace toilets through the Plumbers to People program using toilets bought in bulk. Costs associated with current toilet installs through PTP are $80 for plumber install and removal, and $110 +10% markup per toilet. They calculate water savings at 12,500 gallons per toilet annually.

Tucson Water Toilet Replacement Program:

Tucson currently runs a low-income single-family toilet replacement program offering free replacement of toilets using 3.5 gallons per flush or more. In FY2018-19 they replaced 521 toilets with a total expenditure of $210,032 (includes admin and contract costs), saving 4,468,878 gallons that year.

Using the cost and savings data from SFPUC and Tucson, Table 4 provides a range of the number of toilets needed to achieve the Target.

[7] This increases to $582 per single family install, and between $532 and $667 for multi-family per toilet when including administrative and FTE costs.

Table 4 – Annual Water Savings and Number of Toilet Replacements to Reach Offset Target

	SFPUC	City of Tucson
Savings Per Toilet (gallons)	12,068	8,578
Number of Toilets to achieve 100 AF Water Savings	2,685	3,777
Cost Per Toilet[8]	$582	$403.13
Annual budget for 100 AF Savings	$1,562,670	$1,522,622

Graywater Systems

Graywater rebate programs have typically seen low participation numbers. But it is worth including the program as it can be a supplemental program in part of a broader strategy.

Tucson Water Graywater Rebate Program:

Tucson provides up to $1,000 at 50% of labor and materials costs for gray water systems and estimates 37.2 gallons per day per household of savings for each system. In FY2018-19 they approved 17 rebates for a total of $13,011 and 231,455 gallons of savings.

Using this data, an estimate of the cost and number of graywater systems needed to reach the Target is shown in Table 5.

Table 5 – Annual Water Savings and Number of Graywater Systems to Reach Offset Target

	City of Tucson
Savings Per Graywater System (gallons)	13,615
Number of Systems to achieve 100 AF Water Savings	2,380
Cost Per System[9]	$765.35
Annual budget for 100 AF Savings	$1,821,332

[8] Includes administrative and contractor costs

[9] Includes administrative costs

Rainwater Catchment

Rainwater catchment in the form of rain barrels and cisterns are popular supplemental conservation programs for many urban water suppliers. SAWS distributed 6,000 barrels in a single day in January 2017 and continues to provide rebates toward rain barrels through their WaterSaver Rewards Program. Larger scale rainwater catchment programs with significant water savings have also become more prominent in urban planning, using large underground cisterns and manmade wetlands to capture and reuse rainwater.

This Analysis focuses on rain barrel and cistern rebate programs. On its own, a rainwater catchment rebate program's estimated water savings, though beneficial, might fall short of the conservative Target. But activating it as part of EBMUD's wider conservation strategy would augment conservation and generate credits toward the Target. SFPUC and Tucson Water programs are highlighted in Tables 6, 7, 8.

Table 6 – Rain Barrel and Cistern Rebate Programs

2020	SFPUC
Rain Barrel Rebates	454
Cisterns Rebates	11

SFPUC has a partnership with the Urban Farmer store, offering rebates on different sizes of catchment basins as shown in Table 7.

Table 7 – SFPUC / Urban Farmer Store Rebates

Rebate Amount	Customer Cost	Catchment Tank Size (gallons)
$129	$0	50
$350	$99	205
$350	$299	420

Tucson Water runs a multi-level rainwater harvesting rebate program with Level 1 and Level 2 funding shown below. They employ an "engineering estimate" which assumes the tanks will fill, on average, five times per year.

- Level 1 – Simple/Passive (earthworks) will rebate 50 percent of the cost of eligible material and labor up to $500.
- Level 2 – Complex/Active System (tanks) will rebate system costs up to $2,000 based on gallon capacity:
  - $0.25 per gallon capacity of 50-to-799 gallon tanks
  - $1 per gallon capacity of 800 gallon and larger tanks

Table 8 – Tucson Water Rainwater Harvesting Rebate Program Detail, FY2018-19

Approved Applications	333
Expenditure Level 1	$9,326
Expenditure Level 2	$395,567
Estimated Gallons Offset	2.8 million
Estimated AF Offset	8
Gallons of Storage	550,509

On-site Water Reuse

On-site non-potable water systems "collect wastewater, stormwater, rainwater, and more, and treat it so that it can be reused in a building, or at the local scale for non-potable needs such as irrigation, toilet flushing, and cooling. These systems are usually integrated into the city's larger water and wastewater system and contribute to a more resilient and sustainable water management by using alternate water sources, reducing valuable potable water used for non-potable purposes, and minimizing strain on wastewater systems." (US Water Alliance, 2017)

In multi-family residential buildings, replacing the demand for toilet and urinal flushing and clothes washing with non-potable water can offset up to 40% of the indoor potable water use; for commercial buildings, using non-potable water for toilet and urinal flushing can offset up to 75% of indoor water use.[10] Additional non-potable water demands include irrigation and cooling towers; meeting these demands with non-potable water can further reduce building potable water demands.

On-site water reuse programs require deep integration into building and development processes but can provide significant potable water savings in larger buildings and applications. There are a growing number of resources to help guide the process. Resources include: William J. Worthen Foundation, Water Reuse Practice Guide (2018); and U.S. Water Alliance's National Blue Ribbon Commission for Onsite Non-potable Water Services.

The SFPUC is pursuing a strategy to have many commercial and public-use facilities outfitted with on-site reuse programs. Highlights from SFPUC's Onsite Water Reuse Program:

- 2015 San Francisco Health Code Article 12C requires new development projects of 250,000 square feet or more of gross floor area to install and operate an onsite non-potable water system.
- 2019-2020 SFPUC received 21 applications for onsite water systems bringing total to over 100 projects.
- 2040 water savings from program estimated at 2 MGD.

[10] SFPUC.

- Specific Projects:
  - SFPUC Headquarters: Living Machine™ system recycles 5,000 gpd or 800,000 gallons annually.
  - Chase Center: Designed to collect and treat rainwater, stormwater, graywater, and condensate to supply toilet flushing demands in the arena and two accompanying office buildings. Estimated to save 3.7 million gallons potable water annually.
  - Uber Headquarters: Two separate onsite non-potable water systems, collecting and treating graywater and rainwater separately to meet the building's toilet flushing and irrigation demands. Estimated to save 700,000 gallons potable water annually.