



Water Conservation Coordination Plan

2019-2024

**WATER CONSERVATION COORDINATION
PLAN: IMPLEMENTATION PLAN
2019-2024**

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INTRODUCTION

1. Introduction

INTENT

The Water Conservation Coordination Program is a cooperative effort by the LOTT Clean Water Alliance (LOTT) and its three partner cities – Lacey, Olympia, and Tumwater – to plan and offer indoor water conservation programs that reduce wastewater flows to LOTT treatment facilities. Over 1.2 million gallons per day (gpd) have been conserved since the original flow reduction program began in 1997. LOTT and its partner cities intend to continue the program, as additional water conservation and flow reduction will benefit LOTT, its partners, its communities, and the environment.

The Water Conservation Coordination Committee, which includes representatives from LOTT and each of the three partner cities’ water utilities, developed this Water Conservation Coordination Plan to guide the program for the 2019-2024 planning period. The LOTT Technical Sub-Committee (TSC) and LOTT Board of Directors also reviewed the plan.

Members of the committee during development of this plan included:

City of Lacey	Emily Watts
City of Olympia	Erin Conine
City of Tumwater	Chris Hartman
LOTT Clean Water Alliance	Wendy Steffensen
LOTT Clean Water Alliance	Maegen McAuliffe

PROGRAM IMPLEMENTATION

The program is made possible through an Interlocal Agreement (see [Appendix B](#)) between LOTT, the cities of Lacey, Olympia, and Tumwater, and Thurston County. The Water Conservation Coordination Committee implements the program, with assistance from the partner cities’ water utility staff. TSC provides program oversight.

POLICY STATEMENTS

A list of policy statements, endorsed by the LOTT Board of Directors, guides the program:

1. Consistent with its Wastewater Resource Management Plan and public values expressed during the planning process, LOTT will continue to provide financial and staff support for

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projects that help maximize use of existing LOTT facilities by reducing wastewater flows and maximize benefits to the environment by conserving water.

2. LOTT will pursue cost-effective flow reduction measures as part of a strategy to postpone the need to develop new treatment capacity.
3. The plan should be based on a water conservation goal that is moderately aggressive and reasonably achievable within the planning period, recognizing that achievable savings have decreased with each planning period due to successes already achieved.
4. LOTT's partner water utilities will continue to assume lead responsibility for implementing water conservation projects and should work together with LOTT through participation in the Water Conservation Coordination Committee.
5. TSC will provide oversight for the program and make recommendations to the LOTT Board of Directors.
6. Budgets for water conservation projects will be established as part of LOTT's biennial Budget and Capital Improvements Plan process, while retaining flexibility for the Board to consider funding support for special projects as they are identified. On occasion, large-scale industrial, commercial, and institutional (ICI) projects or other projects may need to be considered outside the budget amount to maintain ongoing program implementation and address special ICI or other projects.
7. Participants in program projects must be LOTT sewer customers with accounts in good standing.
8. Program budgeting and implementation recommendations will be developed using a set of criteria designed to help evaluate and prioritize potential and ongoing projects. First and foremost, the set of criteria will include the requirement that all implemented projects must be cost-effective when compared to the estimated cost of building one gallon of new treatment capacity.
9. The program shall be managed with flexibility to allow for adjustments in light of new and emerging water saving technologies, alternative delivery methods, results of past and ongoing project evaluations, and other factors that affect progress toward the water conservation goal. These factors will be used to develop biennial work plans and budget requests.

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FLOW REDUCTION GOAL

The goal of the Water Conservation Coordination Program for the 2019-2024 planning period is to reduce wastewater flows by at least 120,000 gpd, and ideally by 180,000 gpd. This is in addition to the 1.2 million gpd reduction achieved previously through the program.

The 120,000 gpd goal for the 2019-2024 planning period was obtained by estimating the number of rebates for the most consistently used program projects during the six-year planning period. These projects include high-efficiency toilet (HET) rebates, clothes washer rebates, and water saving kits distribution.

The 2019-2024 flow reduction goal is lower than that of the previous planning period. The program has been in place for over 20 years, and much of the easily achieved water savings has been addressed. Participation rates for many of the incentive projects have declined in recent years. Many customers interested in retrofits have already participated in the program, and many of the highest volume water users have completed retrofit projects. While there is still opportunity for substantial water savings, projects that reduce flows by appreciable volumes are becoming more difficult to identify and involve higher costs than previous efforts. For these reasons, scaling back on the flow reduction goal is consistent with the practices of other utilities with similar conservation programs.

PROGRAM WORK PLAN DEVELOPMENT

As described in the policy statements, the program must be managed with flexibility in order to adjust to new and emerging water saving technologies and delivery methods, assist partner jurisdictions in complying with new regulations related to water use efficiency, and to incorporate project evaluation results in terms of cost, participation, and water savings. This document provides a general work plan for the 2019-2024 planning period and serves as a guide for program implementation. This work plan will be supplemented with development of more detailed biennial work plans, as described later.

The general work plan includes a variety of flow reduction projects, many of which have been previously implemented in some form through the program. Criteria used to select projects for implementation include:

1. Cost-effectiveness – All projects must be cost-effective, so that the estimated cost per gallon to implement the project is equal to or less than the cost of building one gallon of new treatment capacity, currently \$17.39 per gallon.
2. Relative cost-effectiveness – Each project has a degree of cost-effectiveness. How does each project compare in terms of one being more cost-effective than another? LOTT should strive to achieve the greatest public benefit for the lowest cost.

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3. Potential flow reduction and water savings – Emphasis should be placed on projects or customers that represent the greatest volume of potential water savings and flow reduction.
4. Likelihood of success – Emphasis should be placed on projects most likely to succeed, which may depend upon:
 - a. Use of proven technologies
 - b. Customer satisfaction, including satisfaction with equipment, ease of participation, and benefits related to financial savings and improved image
 - c. Ease of implementation, including whether or not the project is established, staffing requirements, expertise needed, and logistical complexity
5. Retrofits or replacements – Emphasis should be placed on projects that encourage early retirement of less efficient equipment through retrofit or replacement with equipment that meets or exceeds current plumbing code standards.
6. Beyond code or current standards – Projects that encourage use of fixtures and equipment that are more efficient than current standards or plumbing codes provide increased potential for long-term flow reduction and water savings.
7. Technology versus behavioral change – Projects that ensure installation and use of equipment or technology that result in immediate flow reduction and water savings are preferred to projects that focus on behavioral change, since behavioral change and associated flow reduction is not guaranteed. For example, single flush HETs are preferred over dual flush toilets because the water savings are guaranteed, rather than dependent upon a change in behavior, such as choosing a lower volume flush. Program dollars are directed to hard fixes like HET installations, which result in immediate flow reduction, rather than smart meter or sub-meter installations, which may or may not draw attention to water use patterns and inspire customers to change their behaviors to use less water.
8. Broad participation – Projects that are available to and used by many customers demonstrate program benefit to ratepayers, fostering a sense of fairness and overall community benefit.
9. Value as demonstration/model projects – Projects that offer opportunities for the public to view and test water saving technologies and learn about the economic benefits of conservation can have an exponential effect on participation in related projects.

CUSTOMER CATEGORIES

LOTT sewer customers fall into one of several categories: single-family (SF) residential, multi-family (MF) residential, and industrial/commercial/institutional (ICI). Projects and incentives may

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differ based on the customer category. These categories are also important for establishing base assumptions regarding water use, which are used to calculate estimated flow reduction. For the purposes of this plan, the following categories and assumptions apply:

1. SF – This category applies to single-family homes and duplex units. These homes are assumed to have 2.3 people per household (LOTT, 2016).
2. MF – This category applies to tri-plex, four-plex, condominiums, and apartment buildings with multiple units. Multi-family units are assumed to support an average of 1.6 people per household, based on 70% of the single-family average (LOTT, 2016).
3. ICI – This category applies to all industries, commercial businesses, and institutions, such as schools, hospitals, and colleges.

PROGRAM WORK PLAN PROJECT DESCRIPTIONS

The general work plan involves implementing the following flow reduction projects within the 2019-2024 planning period. The descriptions provide an overview of each project, including estimated water savings, cost-effectiveness, implementation guidelines, and how implementation is expected to change over the course of the planning period.

CLOTHES WASHER REBATES

2. Clothes Washer Rebates

This project provides rebates for the purchase and installation of resource-efficient clothes washers. The current, flat rate clothes washer rebate is \$50 per household/machine.

PROJECT	FLOW REDUCTION
ENERGY STAR Clothes Washers	14.1 gallons/day/household

Water Savings Assumptions

Clothes washer efficiency has increased step-wise over the past few decades. In the 1980s, washers used approximately 51 gallons of water per load (Vickers, 2001). Today, a high-efficiency clothes washer uses an average of 15 gallons per load (WRF, 2016). The following statistics were used to calculate the water savings for replacing a standard clothes washer with a high-efficiency or ENERGY STAR washer,;

1. Average gallons per load for clothes washers – 31 (WRF, 2016)
2. Percentage of homes with existing high-efficiency or equivalent washers – 25% (WRF, 2016)
3. Average gallons per load for high-efficiency washers – 15 (WRF, 2016)
4. Average loads per person per day – 0.30 (WRF, 2016)
5. Average number of persons per SF and MF households – 2.3 and 1.6 (LOTT 2016)
6. Ratio of SF to MF households obtaining clothes washer rebate – 90:10

To determine the average gallons per load (gpl) for the clothes washers that would be rebated, the contribution of high-efficiency clothes washers to the average was removed.

$$15 \text{ gpl (25\%)} + X \text{ gpl (75\%)} = 31 \text{ gpl}; X = 36 \text{ gpl}$$

To determine the average gallons saved per day by replacing an existing clothes washer with high-efficiency or ENERGY STAR washer, the difference in the gallons per load between the two washers was multiplied by the average loads per day per person (lpdpp), and by the number of persons per household (pphh). The average savings for SF and MF households were multiplied by the ratio of households that historically obtain clothes washer rebates.

$$(36 \text{ gpl} - 15 \text{ gpl}) * 0.30 \text{ lpdpp} * 2.3 \text{ SF pphh} = 14.5 \text{ g/d/hh}$$

$$(36 \text{ gpl} - 15 \text{ gpl}) * 0.30 \text{ lpdpp} * 1.6 \text{ MF pphh} = 10.1 \text{ g/d/hh}$$

$$14.5 (0.9) + 10.1(0.1) = 14.1 \text{ g/d/hh}$$

CLOTHES WASHER REBATES

Cost-Effectiveness

Clothes washer rebates are extremely cost-effective at \$3.55 per gallon, well under the current cost-effectiveness threshold of \$17.39. A rebate amount of \$50 per qualifying clothes washer has proven to be an effective incentive, with consistent customer participation in recent years.

Implementation Guidelines

1. This rebate applies to the purchase and installation of residential-style clothes washers, regardless of the customer category. SF, MF, and ICI customers are eligible.
2. Clothes washer eligibility is determined using the maximum integrated water factor criteria published by ENERGY STAR. ENERGY STAR is a U.S. Environmental Protection Agency (EPA) voluntary program that helps businesses and individuals save money and protect the climate through superior energy efficiency. Machines listed as high-efficiency are not necessarily ENERGY STAR certified. A machine listed as high-efficiency but not ENERGY STAR certified is not eligible for the rebate.
3. Customers must apply for the rebate within six months of the date of purchase.
4. Clothes washers installed at rental properties are also eligible for rebate. The rebate will be provided to either the property owner or the renter, whoever purchases the qualifying machine, as long as the washer is installed at a property receiving LOTT sewer service.
5. Rented or rent-to-own appliances are not eligible for rebate.
6. In general, only one rebate per household will be provided. Exceptions are possible if the customer can identify a compelling need for more than one clothes washer at the property or within the household.
7. Clothes washers replacing older models must replace washers that are at least five-years-old or that are not ENERGY STAR certified in order to qualify for rebate.
8. In general, rebates will not be provided at the same property more than once every five years. Clothes washers are expected to function relatively trouble-free for a minimum of five years, and many last longer. However, exceptions will be granted for replacement of faulty appliances, loss of appliances through divorce or separation, etc.
9. Coin-operated clothes washers for shared MF laundry facilities are also eligible for rebate. Such facilities are eligible to receive rebates for each water-efficient machine purchased and installed in the facility.

CLOTHES WASHER REBATES

10. Large capacity, commercial-grade clothes washers, such as those used in laundromats and hotels, may be eligible for greater rebates through the WaterSmart Technology rebate project.

Process for Participation

To receive a rebate, customers submit to LOTT a completed rebate application; a copy of their city water/sewer bill; and a copy of their purchase receipt with store name, date purchased, brand purchased, model number, purchase price, and proof of payment. LOTT staff confirm eligibility and issue rebate checks for applicants that meet eligibility requirements. LOTT staff occasionally need to contact partner water utilities to confirm LOTT sewer account status if a customer cannot provide a copy of their bill. In cases where there may be questions regarding customer sewer account status or installation location, partner utility staff may be asked to confirm installation prior to final rebate processing.

WATER SAVING KITS

3. Water Saving Kits

LOTT provides the partner utilities with water saving kits for residential kitchen and bathroom fixtures for distribution to SF and MF customers. Current plumbing codes require residential kitchen and bathroom faucets and showerheads use no more than 2.5 gallons per minute (gpm). However, faucets, aerators, and showerheads are available in a wide variety of flow rates, ranging from maximum volumes to those well below current plumbing codes. Many older faucets and showerheads use much greater volumes of water than currently mandated, and it is also common for customers to remove aerators or flow restrictors to create higher-pressure faucets and showerheads that use greater volumes of water than mandated.

LOTT's water saving kits include fixtures that use less water than the current plumbing code standards without compromising function. The volume of water used by each component changes occasionally in response to customer feedback and improved technologies. The water saving kits currently include:

1. Kitchen faucet aerator – 1.5 gpm
2. Bathroom faucet aerator – 1.0 gpm
3. Showerhead – 2.0 gpm
4. Toilet leak detection tablets
5. Plumbers tape
6. Installation instructions

PROJECT	FLOW REDUCTION
Water saving kits	12.1 gallons/day/household

Water Savings Assumptions

Given the wide range of consumption volumes for fixtures currently used in residential settings, it is challenging to quantify the water savings from installing water saving kit components. Flow reduction for households obtaining water saving kits is estimated at 12.1 gpd, based on the specifications of the water saving kit pieces and a number of assumptions:

1. Kitchen faucet – 6.0 gallons per capita per day, based on replacing a 2.5 gpm aerator with a 1.5 gpm aerator, and 6.0 minutes of use (Vickers, 2001)

WATER SAVING KITS

2. Bathroom faucet – 3.0 gallons per capita per day, based on replacing a 2.5 gpm aerator with a 1.0 gpm aerator, and 2.0 minutes of use (Vickers, 2001)
3. Showerhead – 2.7 gallons per capita per day, based on replacing a 2.5 gpm showerhead with 2.0 gpm showerhead, 7.8 minutes of use, and 0.69 showers per day (WRF, 2016)
4. Toilet leak detection tablets – 0.0 gallons per capita per day

According to the EPA, “The average household's leaks can account for more than 10,000 gallons of water wasted every year and ten percent of homes have leaks that waste 90 gallons or more per day.” (EPA, 2017). However, water savings from leak detection tablets are not included in the total estimated savings from the kits due to the difficulty of accurately estimating the occurrence of leaks, frequency of corrective actions, and the volume of each corrected leak.

To determine the average gallons saved per day from replacing kitchen and bathroom aerators and showerheads with the water-efficient models in the water saving kits, the amount of gallons saved per capita when standard fixtures were replaced with water-efficient versions was calculated.

$$((2.5-1.5)*6) + ((2.5-1)*2) + ((2.5-2)*7.8*0.69) = 11.7 \text{ gallons per capita}$$

The amount of water saved in SF residences is higher since the average number of people in SF residences is higher than in MF residences. To obtain the average cost savings of water saving kits across all households, a multiplier reflecting the ratio of SF to MF residences was used. (0.67:0.33; TRPC, 2017)

$$2.3 (11.7) (0.67) + 1.6 (11.7) (0.33) = 24.2 \text{ gallons per household (for full installation)}$$

One additional multiplier was added to estimate more accurately the amount of water conserved through the distribution of water saving kits. The estimated water savings is reduced by half, because there are no assurances that customers will install these free kits after they are obtained. Anecdotal evidence indicates that some customers obtain the three-piece kit in order to obtain only one of the pieces (the cities only distribute the kits as whole kits in order to manage their distribution better).

$$24.2 \text{ gallons per household} * 0.50 = 12.1 \text{ gallons per household (for 50\% installation)}$$

Cost-Effectiveness

Water saving kits currently cost \$8.47 each. Each household is eligible to receive up to three water saving kits, based on the number of bathrooms in their home. Data from the previous planning period showed that, on average, 1.3 kits were taken for each household that redeemed kits. Therefore, cost-effectiveness for this project is estimated as:

$$(8.47 * 1.3) / 12.1 = \$0.91 \text{ per gallon}$$

WATER SAVING KITS

Implementation Guidelines

1. Kits are provided primarily to SF and MF residential customers, although kit components may also be provided to ICI customers with applicable fixtures.
2. LOTT kits are provided only to customers served by the LOTT sewer system. City utility customers served by onsite septic systems are not eligible for LOTT-funded kits. However, partner city utilities routinely provide city-funded water saving kits to their septic customers.
3. Each household is eligible to receive up to three water saving kits, based on the number of bathrooms in their home.

Process for Participation

Customers obtain the kits by contacting their respective city water utility. Each partner utility has a slightly different method for distributing kits and tracking customer participation. However, each partner is responsible for reporting to LOTT the number of kits distributed and the number of households served through the project annually.

HIGH-EFFICIENCY TOILETS

4. High-Efficiency Toilets

HETs offer water savings in many applications, across all customer categories. Toilets installed prior to 1994 do not meet current water use standards, using between 3.5 and 5 gallons per flush (gpf). Even at current standards, conventional toilets use 1.6 gpf, about 20% more than HETs. In either case, replacing these toilets with high-efficiency models provides substantial water savings.

During previous planning periods, LOTT implemented a variety of incentives for installing HETs, depending on the customer category, number of toilets being replaced, and the flush volume of the toilets being replaced. Project implementation became unduly complicated and onerous, not only for LOTT and city utility staff, but also for the customers. The intent for the 2019-2024 planning period is to simplify implementation, reducing the number of different projects and clarifying implementation guidelines. Two ways to obtain rebates for HETs will be offered, providing incentive for toilet replacements across all customer categories:

1. HET rebates (including better than code)
2. WaterSmart Technology rebates

The applicable rebate type will depend on the category of customer, whether it is replacing an existing fixture, water usage of the existing fixture, and in some cases, the number of toilets to be replaced and the customer’s preference for implementation. Table 1 summarizes the applicable project types for various customer categories and scenarios.

Table 1: Applicable Toilet Projects per Customer Category and Scenario

PROJECT	CUSTOMER CATEGORY	
	SF and MF Residential	ICI
Replace 1.6 gpf or greater toilet with HET toilet	HET rebate – \$100	HET rebate – \$100 or WaterSmart rebate* – up to 75% installed costs (*if replacing 3.5 gpf or greater toilet)
Substitute 1.6 gpf toilet with HET toilet in new construction	HET rebate – \$100 (better than code)	HET rebates – \$100 (better than code)

HIGH-EFFICIENCY TOILETS

HIGH-EFFICIENCY TOILET REBATES

This is a flat rate rebate project that provides a uniform rebate for the purchase and installation of qualifying HETs, regardless of customer category and the flush volume of toilets to be replaced. The rebate can be redeemed for up to \$100 per qualifying toilet; qualifying toilets purchased for less than \$100 will be rebated at the purchase price, plus applicable sales tax. This rebate applies to:

1. SF residential customers replacing toilets with flush volumes of 1.6 gpf or greater.
2. MF residential customers replacing toilets with flush volumes of 1.6 gpf or greater.
3. ICI customers replacing 1.6 gpf or greater toilets. ICI customers replacing older toilets that use 3.5 gpf or greater may elect to apply for this type of rebate, or apply for funding under WaterSmart.
4. New construction and remodels for SF, MF, or ICI customers choosing to install HETs rather than standard 1.6 gpf toilets. This is also referred to as the better than code (BTC) project.

PROJECT	FLOW REDUCTION
SF HET	16.3 gallons/day/household
MF HET	11.4 gallons/day/household
ICI HET	30.1 gallons/day/toilet
BETTER THAN CODE	
SF HET	9.4 gallons/day/household
MF HET	6.6 gallons/day/household
ICI HET	17.4 gallons/day/toilet

Water Savings Assumptions

Water savings for HET installation varies depending on the flush volume of the fixtures being replaced, flush volume of the new fixtures, number of people using the fixture, and frequency of use. Because of these variable factors, it is not possible to calculate exact water savings for each program participant. The following standard assumptions are applied to the various customer categories to estimate water savings associated with installation of HETs:

1. SF – Installing HETs is estimated to reduce flows by an average of 16.3 gpd. Flow reduction is calculated by subtracting the number of gallons used per day with an HET from the gallons used per day with a standard existing toilet. The assumptions below were used:

HIGH-EFFICIENCY TOILETS

- a. 5.0 flushes per day per person (WRF, 2016)
 - b. 2.3 persons per household (LOTT, 2016)
 - c. 2.7 gpf average flush (WRF, 2016; the average flush in a US–Canada survey was found to be 2.6 gpf. Given that 9% of those toilets were likely HETs based on flush volume and thus would not be rebated, the average flush is calculated as 2.7 gpf.)
 - d. 1.28 gpf per new fixture (Aquacraft, 2011; some toilets rated 1.28 gpf actually flush slightly more than 1.28 gpf. Aquacraft found the average flush to be 1.4 gpf when assessing a small sample). Although the majority of HETs rebated are rated at 1.28 gpf, models with flush volumes as low as 0.8 gpf, are also rebated. Taking into account the over-flush of some models and the lower rating of other models, using the value 1.28 gpf was considered a fair representation of overall flush volume.
2. MF – Installing HETs is estimated to reduce flows by an average of 11.4 gpd:
- a. 5.0 flushes per day per person (WRF, 2016)
 - b. 1.6 persons per household (LOTT, 2016)
 - c. 2.7 gpf average flush (WRF, 2016)
 - d. 1.28 gpf per new fixture
3. ICI – Installing HETs is estimated to reduce flows by an average of 30.1 gpd. This average takes into account the proportion of older and newer toilets with varying flush volumes and the average number of flushes expected in ICI settings. **ICI customers replacing older toilets with flush volumes of 3.5 gpf or greater can maximize their rebate by applying through the WaterSmart Technology rebate project.**

The average flow reduction for ICI toilets is an estimate derived by the committee because the two existing studies on ICI toilets, both from California, were found to be lacking.

In the first study, the Commercial, Industrial, Institutional Ultra Low Flow Toilet Savings Study by the California Urban Water Conservation Council (1997), a range of savings between 16-57 gpd was identified for the installation of 1.6 gpf toilets, but very little detail was given on how those numbers were derived. This study was used in the 2013-2018 Water Conservation Coordination Plan. To determine gpd saved for the ICI category, the committee obtained an average from the range, and then used a multiplier to account for the fact that the new toilets were 1.28 gpf instead of 1.6 gpf, arriving at a value of 45 gpd for replacement of older 3.5 gpf toilets, and 14 gpd for 1.6 gpf toilets.

HIGH-EFFICIENCY TOILETS

The second study was a more recent reference report from Pacific Gas and Electric (2013). It estimated that the number of average flushes per day for each commercial toilet was 5.9, based on broad assumptions on the number of commercial toilets in California, the number of workers using those toilets, the ratio of men to women in the workplace, and the assumption that urinals were available for male employees. Using 5.9 flushes per toilet, the average water savings for replacing existing toilets with HETs would be 8.3 gpd per toilet. Because the range of water savings from these two reports differed so much, the committee used data from LOTT's WaterSmart Technology rebate project to verify assumptions and check the numbers.

Data from all three cities for 2010-2016 WaterSmart toilet replacement projects was compiled into a sample set of 24 projects with 388 toilets. These data showed that ICI toilets were flushed an average of 21.2 times per day. While using data from the WaterSmart project may over-estimate the number of flushes per toilet, it was assumed that other businesses would also focus on replacing toilets with frequent usage. Further calculation for ICI toilets puts the water savings at 30.1 gpd. Since this number falls between the estimates of the previous studies, the committee decided that the derived number could be used to estimate water savings of ICI toilets. The following assumptions were used in the calculation:

- a. 21.2 flushes per day per ICI toilet
 - b. 2.7 gpf average flush (WRF, 2016)
 - c. 1.28 gpf per new fixture
4. BTC for new construction and remodels –
- a. SF – Installing HETs instead of 1.6 gpf at-code toilets is estimated to reduce flows by an average of 9.4 gpd, based on these assumptions:
 - i. 5.0 flushes per day per person (WRF, 2016)
 - ii. 2.3 persons per household (LOTT, 2016)
 - iii. 2.1 gpf average flush – A recent study found that toilets rated 1.6 gpf flushed at 2.1 gpf on average (Aquacraft, 2011). Statistics on the actual flush volume of current 1.6 gpf models were not found.
 - iv. 1.28 gpf per new fixture
 - b. MF – Installing HETs instead of 1.6 gpf at-code toilets is estimated to reduce flows by an average of 6.6 gpd based on these assumptions.
 - i. 5.0 flushes per day per person (WRF, 2016)
 - ii. 1.6 persons per household (LOTT, 2016)

HIGH-EFFICIENCY TOILETS

- iii. 2.1 gpf average flush (Aquacraft, 2011)
- iv. 1.28 gpf per new fixture
- c. ICI – Installing HETs instead of 1.6 gpf toilets is estimated to reduce flows by an average of 17.4 gpd, based on these assumptions:
 - i. 21.2 flushes per day per toilet (see description in 3 above)
 - ii. 2.1 gpf average flush (Aquacraft, 2011)
 - iii. 1.28 gpf per new fixture

Implementation Guidelines

1. Rebates will only be provided for purchase of qualifying HETs. Qualifying criteria includes:
 - a. Toilet must have a flush volume of 1.28 gpf or less.
 - b. Toilet must score a minimum of 750 grams on MaP performance testing (www.map-testing.com/performance-toilets-testing/).
 - c. Dual flush toilets are not eligible for rebate unless the model has a maximum flush volume of 1.28 gallons or less and is installed in a SF residence. The installation of pressure assisted dual flush toilets are discouraged due to performance issues.
 - d. Only complete toilet fixtures are eligible for rebate. Equipment intended to retrofit an existing toilet fixture is not eligible for rebate.
2. Rebates are intended to replace 1.6 gpf or greater toilets or to install new 1.28 gpf toilets. Rebates cannot be used to replace existing 1.28 gpf toilets.
3. SF customers are eligible for a maximum of three rebates per household, based on the number of fixtures in the home.
4. Customers must apply for rebate within six months of the date of purchase.
5. HETs installed at rental properties are also eligible for rebate. The rebate will be provided to the property owner or the renter, whoever purchases the qualifying toilet, as long as it is installed at a property receiving LOTT sewer service, and its installation is approved by the property owner.
6. Rebates will not be provided for HETs intended to replace other HETs. Rebates will not be provided for installation addresses where three LOTT incentives for HETs have previously been provided.

HIGH-EFFICIENCY TOILETS

Process for Participation

To receive a rebate, customers must purchase a qualifying HET that meets the criteria listed above. LOTT provides a pre-approved list of qualifying toilets for customers as a courtesy, although there are other qualifying toilets that are not included on the pre-approved list. Customers are free to choose any toilet that meets the qualification criteria listed above. However, toilet specifications can be fairly confusing, so customers are encouraged to contact LOTT to verify rebate eligibility prior to purchasing any toilet not on the approved list. To apply for rebate, customers must submit the following to LOTT:

1. Completed LOTT rebate application
2. Copy of city water/sewer bill
3. Copy of toilet purchase receipt with store name, date purchased, brand purchased, model number, purchase price, and proof of payment

LOTT staff confirm eligibility and issue rebate checks for rebate requests that meet eligibility requirements. LOTT staff occasionally need to contact partner water utilities to confirm LOTT sewer account status if a customer cannot provide a copy of their bill. In cases where there may be questions regarding customer sewer account status or installation location, partner utility staff may be asked to confirm installation prior to final rebate processing.

5. WaterSmart Technology Rebates

This project currently includes rebates of up to 75% of the cost for ICI customers to retrofit or install systems, appliances, equipment, or fixtures that reduce wastewater flows. WaterSmart Technology rebates are generally provided at a percentage of the total project cost, based on LOTT's cost-effectiveness threshold. Total project cost generally applies to the costs associated with both the purchase and installation of water-saving equipment and fixtures. Example equipment and fixtures that fall under this project include air-cooled ice machines, clean-in-place systems, in-house water reuse systems, water-efficient cooling systems, commercial dishwashers, and older toilets and urinals. The maximum rebate percentage for WaterSmart Technology projects is 75% of total project cost.

Water Savings Assumptions

WaterSmart Technology rebate projects vary greatly depending on the type of equipment to be replaced or retrofitted and the associated water use patterns. Water savings are calculated for each proposed project on a case-by-case basis, per normal water use patterns for existing equipment, and manufacturer specifications regarding water use for both the existing and the new equipment. In cases where use patterns are not well defined, they may be estimated based on literature or manufacturer values as applicable.

Due to the challenges of measuring water usage for specific equipment, water savings for WaterSmart Technology rebate projects are not generally verified following installation. Metering of the equipment involved is not required, and often not feasible. City staff inspect the completed project to verify installation has taken place as expected, and city staff may review customer water use patterns to compare and identify savings before and after installation. However, savings may not be verifiable in this way, and this type of analysis is not required. Instead, water savings estimates are established based on conservative water use assumptions and manufacturers specifications. All equipment installed as part of a WaterSmart Technology rebate project is expected to remain in place for at least 10 years.

Cost-Effectiveness

WaterSmart Technology rebate projects vary greatly in their water savings potential and project costs. Each proposed project must be evaluated for cost-effectiveness on a case-by-case basis by comparing the eligible rebate amount to the estimated water savings to calculate the estimated cost per gallon of water saved. That figure is then compared that figure to LOTT's cost-effectiveness threshold to determine eligibility.

WATERSMART TECHNOLOGY REBATES

WaterSmart Technology Rebates for HETs

This rebate project applies to ICI customers that plan to replace older 3.5 gpf or greater toilets with HET models. Water savings for installing HETs varies depending on a number of factors, including the type of business, which has significant bearing on water use patterns. The number of flushes per toilet can usually be estimated based on the type of business and the number of employees it has or clients it serves.

Implementation Guidelines

1. WaterSmart Technology rebate levels for each project are determined on a case-by-case basis to ensure the project meets the cost-effectiveness criteria. Rebate levels may be adjusted below 75% to meet the cost-effectiveness criteria.
2. WaterSmart Technology rebate levels are not dependent on the payback period for the customer's share of the project cost. While it makes good fiscal sense for a customer to complete retrofit projects with short payback periods, it is not a guarantee that the project will be completed without the maximum rebate assistance. Most businesses are consumed with tasks more directly related to running their everyday business and may not have the time, money, or inclination to follow-through with retrofit projects without the full rebate incentive, regardless of the length of the payback period.
3. Projects replacing fixtures or equipment that do not meet the plumbing code standards, such as numerous 3.5 gpf toilets and 1.5 gpf urinals, fall under the WaterSmart designation. Projects that replace fixtures or equipment that currently meet plumbing code standards with increased efficiency models fall under the BTC designation.
4. Projects that occur as part of major remodeling or demolition may not qualify for WaterSmart funding. Major renovations trigger a requirement from local community development/plan review department to bring all fixtures up to plumbing code standards. If the improvements in efficiency are mandated as part of the renovations, then they are not eligible for WaterSmart funding. However, they may still be eligible for BTC rebates, as described later. In cases where the type of the work to be done is not clear, LOTT will rely on the respective jurisdiction to determine whether the project qualifies as a retrofit/remodel or as a renovation that would trigger mandatory code improvements.
5. WaterSmart Technology rebate projects that include automated sensors for toilets, urinals, and faucets are not eligible for consideration as part of the total project cost, as their contribution to flow reduction is highly variable. For projects that incorporate the use of sensors, the eligible total project cost is calculated using the cost of equivalent manual fixtures, with the actual added cost of the sensors borne entirely by the customer.

WATERSMART TECHNOLOGY REBATES

6. In general, costs associated with full faucet replacement are not eligible for WaterSmart funding, as long as water savings can be achieved solely by replacement of aerators. Exceptions may be made on a case-by-case basis due to site-specific conditions. For example, older faucets or a large variety of different faucets precludes effective water savings by installation of aerators alone. In those cases, faucet replacement may be eligible if deemed cost-effective.
7. To be eligible for rebate, proposals for retrofits to equipment or fixtures must be accompanied by supportable assumptions or documentation regarding expected performance and flow reduction. Retrofits to toilets, flush valves, and urinals are generally not eligible for rebate due to uncertainties associated with performance, reliability, and flow reduction.
8. Non-fixture and non-installation costs associated with a project may be considered as part of the total project cost if those costs would not have been incurred otherwise. For example, if removal of an old urinal requires tile repair, then costs for that repair are included in the total project cost.
9. Standard, water-efficient faucet aerators and showerheads may be provided to customers participating in WaterSmart free of charge, if installed in association with an approved project, and if deemed cost-effective by the committee.
10. In some cases, remodel, renovation, or change-of-business projects include negotiations to reduce the Capacity Development Charges (CDC) paid to LOTT for the treatment capacity anticipated by the business's wastewater discharge volume. If the CDC has been reduced based on anticipated flow reduction resulting from the installation of water-saving equipment or fixtures, the project costs for the installation of those equipment or fixtures are not eligible for rebate under this project.
11. For WaterSmart toilet projects, the following guidelines also apply:
 - a. This incentive is intended for replacing older toilets with flush volumes of 3.5 gpf or greater.
 - b. This incentive is intended for the installation of HETs that use 1.28 gpf or less and have a MaP score of 750 grams or greater.
 - c. Dual flush toilets are not eligible for WaterSmart rebates.
 - d. In cases where conditions do not favor the use of HETs (e.g. flat sewer lines), 1.6 gpf models may be considered for the rebate, as long as it is determined that the project meets the eligibility and cost-effectiveness requirements of the WaterSmart Technology rebate project.

WATERSMART TECHNOLOGY REBATES

- e. The cost of motion sensors is not eligible for rebate under the WaterSmart project. If the customer chooses to install HETs with motion sensor technology, they must cover the cost for that technology beyond the cost of standard HET fixtures.
12. LOTT's Executive Director can approve WaterSmart rebates up to \$50,000 for immediate processing. TSC must review awards over \$50,000. TSC will then make a recommendation to the LOTT Board of Directors for approval. In most cases, rebates estimated to exceed \$50,000 are presented to TSC and the LOTT Board for pre-approval.
 13. Large rebates may be considered outside the approved biennial program budget amount to allow for continued implementation of other water conservation projects. Such projects are reviewed by TSC and the LOTT Board on a case-by-case basis.

Process for Participation

Interested customers complete a rebate application describing the proposed project, with estimates of total cost and water savings. Partner utility staff provide technical assistance to the customers, and often assist in developing water savings estimates. The WaterSmart Technology rebate application is then reviewed by partner utility staff and LOTT staff to determine eligibility and appropriate rebate level. Once approved, LOTT provides the customer with a Letter of Intent that stipulates the amount of the rebate, the estimated water savings, and the documentation required for rebate processing. The customer then completes the project, submitting invoices and work orders to the partner utility. Completion and documentation of the project should take place within six months of approval. This deadline may be waived by the committee under extraordinary circumstances. Partner utility staff inspect the new equipment, confirm installation by taking photographs, and submit the invoices and work orders to LOTT staff, along with a memo detailing inspection results and recommendations for rebate award processing. The rebate is provided directly to the customer.

BETTER THAN CODE REBATES

6. Better Than Code Rebates

The BTC project provides rebates to all customer categories for installing high-efficiency fixtures or equipment that replace equipment that already meets current plumbing code standards. These rebates may apply to existing buildings, remodels of existing buildings, and new construction. BTC rebates apply to three scenarios:

1. Toilets – A flat rate rebate is provided for the replacement of at-code toilets with HET models, or the purchase and installation of HETs instead of at-code fixtures. The current rebate amount is \$100 per toilet, as described in the HET rebate section.
2. Urinals – A flat rate rebate is provided for the replacement of at-code urinals with high-efficiency models, or the purchase and installation of high-efficiency urinals (HEUs), instead of at-code fixtures. The current rebate amount is \$125 per urinal.
3. Other equipment – This customized rebate amount is determined based on a percentage of the difference in cost between BTC equipment and standard, at-code equivalent equipment, and the potential water savings. The project must meet LOTT’s cost-effectiveness threshold. Projects are currently eligible for rebates up to 75% of total project cost.

BETTER THAN CODE	FLOW REDUCTION
SF HET	9.4 gallons/day/household
MF HET	6.6 gallons/day/household
ICI HET	17.4 gallons/day/toilet
ICI HEU	15.8 gallons/day/urinal

Water Savings Assumptions

1. Toilets – Installing a 1.28 gpf toilet instead of a 1.6 gpf toilet saves approximately 9.4 gpd in SF residences, 6.6 gpd in MF, and 17.4 gpd in ICI settings. Assumptions can be found on page 15.
2. Urinals – The flow reduction for replacing a 1.0 gpf at-code urinal with a 0.125 gpf HEU is estimated to be 15.8 gpd, based on the following assumptions:
 - a. Eligible high-efficiency fixtures use a maximum of 0.125 gpf
 - b. HEUs are used to replace urinals that currently flush 1.0 gpf or more, or are installed in place of an at-code fixture that would have used 1.0 gpf

BETTER THAN CODE REBATES

- c. An average 18 flushes per day, based on EPA WaterSense specifications (2009) and the committee's experience with WaterSmart urinal projects
3. Other equipment – The flow reduction for other equipment is determined on a case-by-case basis, comparing the difference in water use between the at-code and BTC equipment. Equipment specifications detailing water use for both at-code and BTC equipment usually form the basis for this determination.

Implementation Guidelines

1. For toilets:
 - a. See the HET rebate section.
2. For urinals:
 - a. HEUs must use no more than 0.125 gpf.
 - b. When paired with a separate flushometer, that flushometer must also be rated for 0.125 gpf.
 - c. Each HEU is rebated at \$125 per fixture when replacing at-code fixtures.
 - d. In rare cases in which a 0.5 gpf urinal is to be replaced, the rebate is \$75 per fixture.
3. For other equipment:
 - a. Projects are eligible for rebates of up to 75% of the total project cost, but in no circumstances can the rebate amount exceed the cost difference between BTC and at-code equipment.
 - b. The rebate amount is based upon total project cost. The total project cost includes the cost difference between BTC and at-code equipment, and may or may not include installation costs. Installation costs are excluded if those costs would be incurred regardless, as is the case with new construction or major renovations. Installation costs are included if they would not otherwise have been incurred, as in the case of elective equipment replacements.
4. In general:
 - a. New construction projects represent new fixtures, equipment, and flows to the LOTT system. They are required to install fixtures that, at a minimum, meet current plumbing code standards for water use. Therefore, only new construction projects that include installation of fixtures or equipment that perform better than code are eligible for rebate.
 - b. Costs associated with full faucet replacement are not eligible for funding under BTC, as long as water savings can be achieved solely by the replacement of aerators. Exceptions may be made on a case-by-case basis due to site-specific conditions. For example, older

BETTER THAN CODE REBATES

faucets or a large variety of different faucets precludes effective water savings by installation of aerators alone. In those cases, faucet replacement may be eligible if deemed cost-effective.

- c. To be eligible for rebate, proposals for retrofits to equipment or fixtures must be accompanied by supportable assumptions or documentation regarding expected performance and flow reduction.
- d. To ensure the rebate amount does not exceed the additional costs incurred to purchase BTC fixtures in new construction projects, the customer may be required to provide cost information for equivalent at-code fixtures that could have been considered for the project.
- e. In some cases, new construction or remodel projects include negotiations to reduce the CDC paid to LOTT for the treatment capacity anticipated by the business's wastewater discharge volume. If the CDC has been reduced based on anticipated flow reduction resulting from the installation of BTC equipment or fixtures, the project costs for the installation of those equipment or fixtures are not eligible for rebate under this project.

Process for Participation

For these scenarios, customers fill out an application. Partner utility staff often provide technical assistance to customers to estimate water savings and complete paperwork.

1. For toilet and urinal projects, customers must include a completed rebate application, a copy of their city water/sewer bill, and a copy of the purchase receipt with store name, date purchased, brand purchased, model number, purchase price, and proof of payment. The model information is used to verify that the new fixture(s) is high-efficiency.
2. For projects involving equipment other than toilets and urinals, each project is reviewed and pre-approved on a case-by-case basis using a process similar to WaterSmart rebates. The application is reviewed by partner utility staff and LOTT staff to determine eligibility and the appropriate rebate level. Once approved, LOTT provides the customer with a Letter of Intent that stipulates the amount of the rebate, the estimated water savings, and the documentation required for rebate processing. The customer then completes the project, submitting invoices and work orders to the partner utility. Partner utility staff inspect the new equipment, confirm installation by taking photographs, and submit the invoices and work orders, along with a memo detailing inspection results and recommendations for the rebate award to LOTT staff for processing.

PRE-RINSE SPRAY VALVES

7. Pre-Rinse Spray Valves

Pre-rinse spray valves (PRSVs) are used in the restaurant business. They are handheld devices consisting of a spray nozzle and a lever, which are designed to spray a forceful stream of water on dishes and other food service items to remove food residue before cleaning. PRSVs can use up to one-third of a commercial kitchen's total water usage. The federal standard, enacted in 2005 as part of the Energy Policy Act, limits PRSV water consumption to 1.6 gpm (EPA, 2013). Through testing, it was determined that flow rates lower than 1.6 gpm, and higher than 1.0 gpm, not only save more water and energy than 1.6 gpm models, but they are equally effective (EPA, 2011).

PRSVs will be offered to restaurants as a pilot project, starting in 2018. The goals of this project are to assess whether distributing PRSVs to restaurants is an effective tool for saving water and whether it will serve as a conversation-starter with restaurant owners about additional ways to conserve water.

As part of the pilot project, new 1.1 gpm PRSVs will be offered to restaurants in exchange for their PRSVs with flows greater than 1.1 gpm, or for 1.1 gpm PRSVs that are no longer functional. Data will be collected about the types of PRSVs that restaurants currently use.

PROJECT	FLOW REDUCTION
PRSV	15 gallons/day/valve

Water Savings Assumptions

To calculate the amount of water saved by replacing a standard 1.6 gpm PRSV with a 1.1 gpm PRSV, the amount of water per day was calculated for each type, and the difference between the two was found. Because there is not a great cost differential between the 1.6 and 1.1 gpm PRSVs, cost is not a driver for restaurant owners when choosing which type to purchase. Because of this, it is conservatively estimated that, in the absence of the incentive, approximately half of the restaurant owners would choose PRSVs using 1.6 gpm.

$$(1.6 \text{ gpm}(64 \text{ minute})(344 \text{ days}/ 365 \text{ days}) - 1.1 \text{ gpm}(64 \text{ minute})(344 \text{ days}/ 365 \text{ days})) * 50\%$$

$$(96 \text{ gallons}/ \text{day}- 66 \text{ gallons}/ \text{day}) * 50\% = 30 \text{ gallons per day} * 50\% = 15 \text{ gallons}/ \text{day}$$

1. Standard PRSV – 1.6 gpm
2. Average minutes per day the PRSV is used – 64 (EPA, 2013)
3. Average days per year the restaurant is open – 344 (EPA, 2013)

PRE-RINSE SPRAY VALVES

4. WaterSense PRSV distributed through the PRSV pilot project – 1.1 gpm
5. Proportion of standard PRSV at 1.6 gpm: PRSV at 1.1 gpm – 50% (estimated)

Cost-Effectiveness

Cost-effectiveness is estimated to be \$2.33, well under the cost-effectiveness threshold of \$17.39. Cost-effectiveness is calculated based on the price per PRSV divided by the estimated gallons saved per day, therefore:

$$\$34.95/15 \text{ gpd} = \$2.33$$

Implementation Guidelines

To implement this pilot project, partner water utility representatives will visit select restaurants served by LOTT. They will offer one or more free PRSVs in exchange for the existing PRSVs installed at the restaurant. They will also offer a water savings audit and some ideas to further conserve water and take advantage of rebates.

Process for Participation

Restaurants will be contacted by partner water utility representatives. Any restaurant interested in obtaining a free PRSV can contact LOTT or their utility representative.

8. Program Implementation and Planning

PROGRAM IMPLEMENTATION PLAN

As stated earlier, rebates for HETs and clothes washers, as well as the distribution of water saving kits, are the most popular and consistent projects in the program. These projects achieve considerable water savings with minimal outreach to customers. The pilot project for PRSV distribution will be driven by visits from partner water utility representatives and will be evaluated on an annual basis.

WaterSmart rebates and BTC rebates are long-established projects that have been underutilized. To increase the use of WaterSmart rebates, specific retrofit campaigns may be promoted to target customers and encourage participation. Potential campaigns will be explored, along with opportunities to leverage marketing assistance from vendors of water-efficient fixtures and equipment. One or more targeted WaterSmart campaigns may be implemented during the planning period. Potential target campaigns include:

1. Ice machines for restaurants and cafeterias
2. Cooling systems for office buildings
3. Showerheads, clothes washers, and other equipment for fitness centers
4. Water-efficient fixtures and equipment for assisted living and retirement centers

To increase the use of the BTC rebate, the committee will look into ways to coordinate with partner community development departments and the private development community to advertise that remodels installing BTC fixtures may be eligible for rebates.

PROGRAM ASSESSMENTS AND UPDATES

The program is assessed on a yearly basis and at the end of each planning period. The following are assessed for each separate project:

1. Amount of gallons saved per day
2. Cost
3. Cost-effectiveness
4. Ease or difficulty in implementation

PROGRAM IMPLEMENTATION AND PLANNING

Assessment data are determined by calculations shown throughout the plan, and contained herein as [Appendix A](#). A determination of which projects to retain, alter, or remove is made at the end of each planning period based on the assessment data.

Updates to the plan occur at the end of each planning period, when each part of the plan is reassessed. Mid-term changes to the plan may occur based on the best professional judgement of the committee. A determination of whether to modify the plan will be made if technology changes, or if an assumption used to calculate gallons or cost savings is found to be in error. As a general rule, if calculations change the savings value of any specific project by 15% or more, modifications to the text, assumptions, and calculations will be made and reflected in an addendum.

PROMOTIONAL/EDUCATIONAL EFFORTS

Consumer education can play a significant role in water conservation and wastewater flow reduction. While the program provides a variety of opportunities for LOTT customers to participate in water saving projects, others may be encouraged to save water through simple efforts to inform consumerism. For example, LOTT hosts a water saving tips page on its website, posts on social media, and sends a water saving tips brochure to rebate participants. LOTT's WET Science Center also promotes water conservation via social media and includes educational resources related to water calculators, water footprints, and conservation-related activities on its website.

In addition to online resources, the WET Science Center provides a range of opportunities to educate visitors of all ages about where their water comes from and how to conserve water. Saturday programs and activities, school field trip programs, and the interactive exhibit gallery all include water conservation messaging. The WET Science Center currently features several interactive displays related to water conservation, including:

1. A giant water calculator that allows visitors to add up their daily activities to discover how many gallons of water they use each day, and then compare their usage to the average used in Thurston County, the United States, and globally
2. Two interactive games about the urban water cycle, helping individuals understand where their water comes from
3. A mock toilet offering a variety of water-saving tips with each flush
4. A mock kitchen and laundry area with additional tips
5. A humorous, interactive video that features a fictional family and compares their current water-wasting activities to water-saving alternatives, highlighting the potential water savings in various rooms of their home

PROGRAM IMPLEMENTATION AND PLANNING

6. Educational signage, HETs, and low flow faucets on display in the public restrooms.

The WET Science Center sees thousands of students and community members each year, and they are encouraged to take home a free five-minute shower timer. Surveys indicate that 95% of surveyed visitors say that they are more likely to conserve water at home after visiting the WET Science Center. The WET Science Center will continue to help spread messages about water conservation and flow reduction, and additional displays related to water conservation may be developed during the planning period.

OPPORTUNITIES FOR COLLABORATIVE PROJECTS

Opportunities for collaboration with other partners may emerge over the planning period. LOTT has previously partnered with Puget Sound Energy (PSE) on water conservation projects that also offered energy conservation benefits. In some cases, such as the PRSV project completed in 2006, cost-sharing resulted in water savings and a cost-effective project. In other cases, like with clothes washers, rebates are provided by both LOTT and PSE – this maximizes incentives for consumers and may boost participation. Joint promotion of incentives may be worthwhile in instances such as these. Local groups, like Thurston Energy and Thurston Chamber of Commerce’s Green Business committee, can provide opportunities to promote LOTT’s water conservation incentives. Agency-led audits of ICI customers, through LOTT’s Pretreatment Program, Thurston County’s Hazardous Waste Program, and the Washington State Department of Ecology’s Technical Resources for Engineering Efficiency Program, may also yield opportunities to share information and promote incentive programs. These types of opportunities will be explored during the planning period.

AS YET TO BE IDENTIFIED PROJECTS

Within the six-year planning period, promising new technologies or alternative delivery methods may be identified, in addition to those described above. Flexibility is a key component of the plan. This general program work plan and the projects listed here provide a framework for program implementation. Other projects may warrant further evaluation during the planning period. Certainly, the schedule and the projects of particular focus may change over time as current efforts are evaluated, and new water conservation and wastewater flow reduction opportunities emerge.

VOLUME-BASED RATES INFORMATION

Volume-based rates are often suggested as a means of incentivizing water conservation. Volume-based rates are not addressed as part of this plan because they are not generally effective at influencing non-discretionary water use, such as indoor water uses related to wastewater, and because of the significant logistical issues associated with changing to volume-based rates. The question of volume-based wastewater rates is one that the LOTT Board of Directors reviews periodically; most recently in 2016 as part of the Cost of Service study. Data from that effort

PROGRAM IMPLEMENTATION AND PLANNING

revealed that LOTT's operating costs are overwhelmingly fixed costs that are not dependent on the volume of flow being treated. These costs are 90% fixed and only 10% volume dependent. This finding reinforced LOTT's use of a flat rate service charge.

GENERAL PROGRAM WORK PLAN

The project descriptions above are part of an overall program work plan, or framework, for implementing the program. It is essential that this work plan be treated only as a general guide to implementation.

For the overall work plan, it is assumed all projects will be ongoing. These include rebates for clothes washers, HETs, BTC fixtures, and WaterSmart projects, as well as the distribution of water saving kits, and the pilot PRSV project. Each project will be reviewed on a biennial basis, and changes to that project will be considered. Changes may include outreach or promotion for specific projects, adjustments in how projects are implemented, additions or elimination of targeted campaigns, and discontinuation of projects or project elements.

DEVELOPMENT OF BIENNIAL WORK PLANS

As detailed in the Interlocal Agreement, the committee will develop biennial work plans for each budget cycle in the planning period. The biennial work plans may deviate from the overall program work plan, as changing conditions, technologies, and program results are considered in an effort to maximize program effectiveness and progress toward the flow reduction goal. Development of the biennial work plans allows for program adjustment as needed to:

1. Meet the overall flow reduction goal
2. Incorporate results of past and ongoing projects
3. Respond to new opportunities for flow reduction not previously identified
4. Respond to changing marketplace or consumer interests and behaviors
5. Meet changing water use efficiency rules
6. Match anticipated funding levels and staffing resources

The committee is tasked with developing the biennial work plans by July prior to each year in the planning period. Each biennial work plan will include a tentative schedule detailing tasks and estimated costs associated with each task or project. Funding for each biennial work plan will be considered by the LOTT Board of Directors during the development of each respective biennial budget and capital improvements plan.

PROGRAM IMPLEMENTATION AND PLANNING

Table 2: 2019-2020 Biennial Work Plan

PROJECT/TASK	QUARTER								COST
	1	2	3	4	5	6	7	8	
Clothes washer rebates	X	X	X	X	X	X	X	X	\$20,000
Water saving kits	X	X	X	X	X	X	X	X	\$20,000
HET rebates – SF, MF, and BTC residential	X	X	X	X	X	X	X	X	\$210,000
ICI – HET, HEU, PRSV, and BTC	X	X	X	X	X	X	X	X	\$20,000
WaterSmart Rebates	X	X	X	X	X	X	X	X	\$160,000
Choose target industry sector	X				X				
Identify related vendors/associations		X				X			
Develop targeted marketing materials		X	X			X	X		
Implement targeted campaign			X	X			X	X	
Consumer Education Materials									\$0
Identify and Adapt Consumer Resources	X		X		X		X		
Add content and links to website	X		X		X		X		
Printing Promotional Materials		X		X		X		X	\$10,000
2019-2020 Total									\$440,000

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ACRONYM GLOSSARY

10. Acronym Glossary

ACRONYM	DEFINITION	PAGE
BTC	better than code	13
CDC	Capacity Development Charges	20
EPA	Environmental Protection Agency	7
gpd	gallons per day	1
gpf	gallons per flush	12
gpl	gallons per load	6
gpm	gallons per minute	9
HET	high-efficiency toilet	3
HEU	high-efficiency urinal	22
ICI	Industrial, commercial, and institutional	4
lpdpp	loads per day per person	6
MF	multi-family	4
pphh	persons per households	6
SF	single-family	4
TRPC	Thurston Regional Planning Council	32
TSC	Technical Sub-Committee	1

APPENDIX A

11. Appendix A

CALCULATIONS FOR WATER SAVINGS

Flow Reduction Goal

To calculate the flow reduction goal for the 2019-2024 plan, the committee projected the water savings from the most consistently used projects – clothes washers, HETs, and water saving kits. To make this projection, the committee took the number of rebates and kits from the previous five years (2013-2017), converted them to water savings using the 2019-2024 formulas, and then applied Excel's forecast function out into the year 2024. The projections from 2021 were used to estimate the totals for each year. This number was multiplied by six to get a flow reduction for all six years.

WASHERS		
Year	Number	GPD-New Calculation
2013	535	7544
2014	461	6500
2015	348	4907
2016	220	3102
2017	335	4724
2018	188	2644
2019	142	2006
2020	113	1599
2021	78	1098
2022	-5	-75
2023	-32	-449
2024	-81	-1140

APPENDIX A

HET: SF RESIDENCES			
Year	Number	Households	GPD-New Calculation
2013	671	456	7433
2014	600	434	7074
2015	965	663	10807
2016	879	605	9862
2017	760	544	8867
2018	912	645	10505
2019	949	669	10900
2020	893	640	10437
2021	944	679	11069
2022	996	715	11657
2023	988	715	11655
2024	1009	734	11963

WATER SAVING KITS		
Year	Number	GPD-New Calculation
2013	286	3461
2014	533	6449
2015	410	4961
2016	478	5784
2017	490	5929
2018	545	6598
2019	523	6324
2020	577	6981
2021	592	7160
2022	616	7452
2023	634	7666
2024	666	8064

APPENDIX A

SUM OF YEAR 2021 VALUES	FOR 6 YEARS
19327	115962

Clothes Washer Rebates

To calculate the cost savings for replacing a less efficient model with an ENERGY STAR model, the following calculations were done:

1. To get the average gallons per load per clothes washer to be rebated, the contribution of high-efficiency clothes washers to the overall average for washers was removed.
2. To get the average gallons saved per day from replacing an existing clothes washer with an ultra-efficiency or ENERGY STAR washer, the difference in the gallons per load between the two washers was multiplied by the average loads per day per person (lpdpp) and by the number of persons per household (pphh).
3. The average savings for SF and MF households were multiplied by the ratio of these households that historically obtain clothes washer rebates.

ASSUMPTIONS	
Average gallons per load for clothes washers (WRF, 2016)	31
Percentage of homes with existing high-efficiency or equivalent washers (WRF, 2016)	25%
Average gallons per load (gpl) for high-efficiency washers (WRF, 2016)	15
Average loads per person per day (WRF, 2016)	0.30
Average number of persons per SF household (LOTT, 2016)	2.3
Average number of persons per MF household (LOTT, 2016)	1.6
Ratio of SF to MF households obtaining washer rebate	90:10

FORMULAS	CALCULATIONS
$15\text{gpl} (25\%) + X \text{gpl} (75\%) = 31 \text{gpl}; X = 36 \text{gpl}$	36.3 gallons/load
$(36 \text{gpl} - 15 \text{gpl}) * 0.30 \text{lpdpp} * 2.3 \text{SF pphh} = 14.5$	14.5 gallons/day/household
$(36 \text{gpl} - 15 \text{gpl}) * 0.30 \text{lpdpp} * 1.6 \text{F pphh} = 10.1$	10.1 gallons/day/household
$14.5(0.9) + 10.1(0.1) = 14.1$	14.1 gallons day/household

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COST-EFFECTIVENESS

\$50 cost of rebate/14.1 gpd saved

\$3.50 per gallon saved

Water Saving Kits

The water saving kits include a kitchen faucet aerator, a bathroom faucet aerator, and a showerhead. These use less water than mandated by Washington State law, as follows:

1. Kitchen – 1.5 gpm instead of 2.5 gpm
2. Bathroom – 1.0 gpm instead of 2.5 gpm
3. Shower – 2.0 gpm instead of 2.5 gpm.

Kits cost \$8.47 (includes kit, tax and shipping, 2018), and 1.3 kits are taken per household on average. The calculations were done as follows:

1. Calculating per capita water use when all three kit pieces replace standard pieces
2. Calculating household use for combined SF and MF residences, when all three kit pieces replace standard pieces
3. Adding a 50% multiplier, because the installation of all three kit pieces cannot be assured

ASSUMPTIONS

Kitchen faucet use per person per day (estimated per Vickers, 2001)	6 minutes
Bathroom faucet use per person per day (estimated per Vickers, 2001)	2 minutes
Shower use per person per day (WRF 2016)	7.8 minutes/ 0.69 showers
Average number of persons per SF household (LOTT, 2016)	2.3
Average number of persons per MF household (LOTT, 2016)	1.6
Ratio of SF to MF households (TRPC, 2017)	0.67:0.33

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FORMULAS	CALCULATIONS
$((2.5-1.5)*6) + ((2.5-1)*2) + ((2.5-2)*7.8*0.69) = 11.7$	11.7 gallons/day/person
$(11.7) (0.67) + 1.6 (11.7) (0.33) = 24.2$	24.2 gallons/day/household
$24.2 (0.5) = 12.1$	12.1 gallons/day/household

COST-EFFECTIVENESS	
$(\$8.47*1.3)$ cost of rebate/12.1 gpd saved	\$0.91 per gallon saved

HET Rebates (SF, MF, and BTC)

To calculate the cost savings for replacing a less efficient toilet with an HET that has a MaP score of 750 grams or greater and a flush volume of 1.28 gpf or less, the difference in gpf was calculated between the two toilets, taking into consideration the flush volume of the toilets and the number of people in the household.

ASSUMPTIONS	
Flushes per person per day (WRF, 2016)	5.0
Average gallons used per flush (calculated based on WRF, 2016)	2.7
Average number of persons per SF household (LOTT, 2016)	2.3
Average number of persons per MF household (LOTT, 2016)	1.6
Average gallons used per flush for toilets rated 1.6 gpf (Aquacraft, 2011)	2.1

FORMULAS	CALCULATIONS
$SF ((5.0)(2.3) (2.7)) - ((5.0) (2.3) (1.28)) = 16.3$	16.3 gallons/day/household
$MF ((5.0)(1.6) (2.7)) - ((5.0) (1.6) (1.28)) = 11.4$	11.4 gallons/day/household
$SF\ BTC ((5.0)(2.3) (2.1)) - ((5.0) (2.3) (1.28)) = 9.4$	9.4 gallons/day/household
$MF\ BTC ((5.0)(1.6) (2.1)) - ((5.0) (1.6) (1.28)) = 6.6$	6.6 gallons/day/household

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COST-EFFECTIVENESS	
SF \$100 cost of rebate/16.3 gpd saved	\$6.13 per gallon saved
MF \$100 cost of rebate/11.4 gpd saved	\$8.77 per gallon saved
SF BTC \$100 cost of rebate/9.4 gpd saved	\$10.64 per gallon saved
MF BTC \$100 cost of rebate/6.6 gpd saved	\$15.15 per gallon saved

HET Rebates (ICI)

To calculate the cost savings for replacing a less efficient toilet with an HET that has a MaP score of 750 grams or greater and a flush volume of 1.28 gpf or less, the difference in gpf was calculated between the two toilets, taking into consideration the flush volume of the toilets and the number of times the toilet is flushed. Because of the wide variation in types of businesses, toilets per business, number of employees per business, and the number of visitors per business, the two estimates found the literature for number of flushes per toilet in an ICI setting varied greatly. LOTT used its WaterSmart toilet replacement project to determine average number of flushes per day for local businesses. Formulas are shown for replacing a toilet with an average flush volume and for BTC.

FORMULAS	CALCULATIONS
ICI $((21.2) (2.7)) - ((21.2) (1.28)) = 30.1$	30.1 gallons/day/toilet
ICI BTC $((21.2) (2.1)) - ((21.2) (1.28)) = 17.4$	17.4 gallons/day/toilet

COST-EFFECTIVENESS	
ICI \$100 cost of rebate/30.1 gpd saved	\$3.32 per gallon saved
ICI BTC \$100 cost of rebate/17.4 gpd saved	\$5.75 per gallon saved

Urinals (BTC)

The cost savings for replacing an at-code 1.0 gpf urinal with a 0.125 gpf HEU was calculated by subtracting the difference in gpf for the two urinals over the course of a day, given equal flushing rates.

ASSUMPTIONS	
Average flushes per day (EPA WaterSense specifications, 2009)	18

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FORMULAS	CALCULATIONS
$1(18) - 0.125(18) = 15.8$	15.8 gallons/day/urinal

COST-EFFECTIVENESS	
\$125 cost of rebate/15.8 gpd saved	\$7.91 per gallon saved

PRSV

This is a pilot project for replacement of PRSVs in commercial kitchens. The cost savings for replacing an at-code 1.6 gpm PRSV with a high-efficiency 1.1 gpm PRSV was calculated by subtracting the difference in gpm for the two PRSVs. The formula took into account the average minutes PRSVs are used and the average number of days restaurants/commercial kitchens are open. This value was decreased by 50%, because it is estimated that some kitchens may already have 1.1 gpm PRSVs. These will also be replaced if needed.

ASSUMPTIONS	
Average minutes of use per day (EPA, 2013)	64
Average days per year restaurant is open (EPA, 2013)	344
Proportion of standard PRSV at 1.6 gpm: PRSV at 1.1 gpm (estimated)	50%

FORMULAS	CALCULATIONS
$(1.6(64 \text{ min})(344 \text{ days}/365 \text{ days}) - 1.1 \text{ gpm}(64 \text{ min})(344 \text{ days}/365 \text{ days}))$	30.0 gallons/day/PRSV
$30.2 * 0.5$	15.1 gallons/day/PRSV

COST-EFFECTIVENESS	
\$35 cost of rebate/15.1 gpd saved	\$2.32 per gallon saved

12. Appendix B

AN INTERLOCAL AGREEMENT BETWEEN THE LOTT CLEAN WATER ALLIANCE AND THE CITIES OF LACEY, OLYMPIA AND TUMWATER AND THURSTON COUNTY

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INTERLOCAL COOPERATION AGREEMENT BETWEEN THE LOTT CLEAN WATER ALLIANCE AND THE CITIES OF LACEY, OLYMPIA AND TUMWATER AND THURSTON COUNTY REGARDING JOINT WASTEWATER FLOW REDUCTION AND WATER CONSERVATION PROJECTS

WATER CONSERVATION COORDINATION PROGRAM 2019 THROUGH 2024

This AGREEMENT is made and entered into this ___ day of _____, 2018 by and between the LOTT Clean Water Alliance (LOTT) and the cities of Lacey, Olympia and Tumwater (the cities) and Thurston County (county). LOTT, the cities and the county are also jointly referred to as “the Parties”. This AGREEMENT sets out the mission, objectives, and general program elements of the Water Conservation Coordination Program beginning on January 1, 2019 and concluding on December 31, 2024.

WHEREAS, the Parties have previously coordinated a successful program and, as of August 1, 2012, achieved the original flow reduction/water conservation goal of 1,000,000 gallons per day; and as of December 31, 2017, exceeded the 2013-2018 flow reduction goal of 175,000 gallons per day; and

WHEREAS, the Parties share an interest in continuing the program to further flow reduction and water conservation; and

WHEREAS, the Water Conservation Coordination Committee (WC3), consisting of technical staff from LOTT and each of the cities, has been and will continue to be responsible for developing, managing, and implementing the program; and

WHEREAS, the LOTT Technical Sub-Committee (TSC), consisting of Public Works Directors from the three cities, the Director of Thurston County Environmental Health Division, the LOTT Executive Director, LOTT Operations and Facilities Director and LOTT Engineering Director, will provide oversight for the program and make recommendations to the LOTT Board of Directors; and

WHEREAS, RCW 39.34.010 permits local governmental units to make the most efficient use of their powers by enabling them to cooperate with other localities on a basis of mutual advantage; and

WHEREAS, RCW 39.34.080 authorizes a public agency to contract with another public agency to perform any governmental service that each public agency is authorized to perform, provided that such contract shall be authorized by the

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governing body of each party to the contract; and

WHEREAS, it is necessary for the Parties to enter into an agreement to set forth the terms, conditions, and requirements for the implementation of the Water Conservation Coordination Program;

NOW, THEREFORE, in consideration for the terms and conditions contained herein, the Parties agree as follows:

1. MISSION:

The mission of the AGREEMENT is to reduce wastewater flows, thereby delaying the need to develop additional wastewater treatment capacity, through implementation of the Water Conservation Coordination Plan (Plan). The Plan establishes a wastewater flow reduction goal of at least 120,000 gallons per day by 2024. This goal is in addition to flow reduction savings accomplished from 1997-2018.

2. OBJECTIVES:

The objectives for the plan include:

- Continue interlocal coordination efforts to achieve cost-effective wastewater flow reduction and water conservation savings from LOTT wastewater customers;
- Provide wastewater flow reduction opportunities for single-family customers, multi-family customers, and industrial/commercial/institutional customers;
- Continue existing conservation projects, such as distribution of indoor water saving kits, rebates for water-efficient washing machines, incentives for water -saving retrofits by industrial/commercial/institutional customers, and incentives for high-efficiency toilets, so long as each project is cost-effective;
- Utilize the cost of an additional gallon of treatment capacity as the threshold for determining cost-effectiveness of potential program elements;
- Research potential program elements as identified in the plan and adjust program offerings as needed to include additional cost-effective measures;
- Respond to advances in water -saving technology and regulatory requirements, and adjust program elements as needed;
- Gather quantitative data regarding savings related to program elements to measure program success and guide future efforts;
- Simplify and streamline program offerings to improve ease of participation for

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customers, make program implementation more efficient, and optimize staffing resources; and

- Maintain flexibility in program implementation, evaluating the effectiveness of program elements, and adjusting incentives and program elements as necessary to reach the wastewater reduction goal.

3. PROGRAM ELEMENTS:

The Plan guides the implementation of the program. The Plan has been updated for the 2019-2024 planning period, and is hereby incorporated by reference. Activities to be implemented as part of the program fall under the general program elements listed below:

- ENERGY STAR Clothes Washer Rebates
- High-Efficiency Toilet Rebates
- WaterSmart Technology Rebates
- Better-than-Code Rebates
- Water-Saving Kits
- Promotional/Educational Efforts

4. BIENNIAL WORK PLAN AND BUDGET:

The Parties recognize that all elements of the approved Plan cannot be implemented simultaneously due to budget and staffing issues, and they recognize that new water saving technologies and approaches not included in the approved plan may be identified during the term of this AGREEMENT. Accordingly, a biennial work plan and associated funding shall be developed every other year of the term of this AGREEMENT pursuant to the process set forth below.

4.1 Process

1. By July prior to each LOTT budget cycle, WC3 will prepare a draft work plan and proposed funding request detailing planned program activities for the biennium.
2. The draft work plan and funding request will be routed to TSC for review and consideration.
3. The budget request associated with the work plan will be considered by the LOTT Board of Directors as an element of the biennial LOTT budget process. LOTT staff, TSC, and/or the LOTT Board of Directors, may request revision of the work plan and associated budget request as necessary, prior to final approval. No joint budget is created by this AGREEMENT; each party maintains control and

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discretion over its own budget. Further, this AGREEMENT creates no Joint Board and no separate legal entity.

5. RESPONSIBILITIES:

5.1 LOTT

Staff members of the LOTT Clean Water Alliance will be responsible for the following duties in a given year, provided that the LOTT budget allocation allows:

- 1) Facilitate interlocal coordination and implementation of the Plan and biennial work plans through regular meetings of WC3;
- 2) Plan for and manage data associated with the Plan;
- 3) Provide annual data summaries to WC3 for program planning;
- 4) Coordinate with the three cities to complete public information and education and marketing program elements;
- 5) Administer contracts associated with program implementation;
- 6) Provide funding for program implementation under the approved work plans and associated budget item;
- 7) Manage the program budget; and
- 8) Provide administrative and technical support for program development, implementation, and evaluation.

5.2 The Cities

The cities agree to make a good faith effort to participate at the staffing levels necessary to implement the work plans and the overall program, as permitted by the adoption and approval of each city's annual or biennial budget.

The cities will, to the extent that is feasible given each agency's staffing and budgetary resources:

1. Participate in interlocal WC3 coordination meetings;
2. Participate in development of the biennial work plans;
3. Support program implementation, through activities such as promotion of program offerings, direct customer outreach and technical support, distribution of incentive materials and water saving equipment, and collection of program related data;

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4. Provide water use data as needed for program evaluation and planning;
5. Provide feedback and evaluation where needed to adjust program elements and meet overall wastewater reduction goals.

5.3 The County

This AGREEMENT acknowledges that the county currently does not have water utility customers that receive LOTT sewer service, and therefore, is not currently an active participant in development and implementation of the program. In the event that the county develops a water utility customer base with LOTT sewer service, the county may become active in the program. At such time, county roles and responsibilities will be the same as those listed above for the cities.

6. DURATION:

The terms and performance of this AGREEMENT shall commence January 1, 2019 after the approval by the governing bodies of all of the Parties and following the fulfillment of the requirements set forth in RCW 39.34.040. This AGREEMENT will terminate on December 31, 2024.

7. TERMINATION:

This AGREEMENT may also be terminated in whole or in part by mutual AGREEMENT of the Parties. Any termination by mutual AGREEMENT shall be in writing and shall set forth the conditions of termination including the effective date. Any party wishing to withdraw from the Agreement may do so in writing and shall set forth the reasons for withdrawing and the effective date of the withdrawal.

LOTT may terminate this AGREEMENT in the event that funding, staff or resources for performance under this AGREEMENT are withdrawn, reduced or limited in any material way after the effective date of this AGREEMENT. Termination under this paragraph shall be effective upon the date specified in LOTT's written notice of termination.

8. RECORDING:

LOTT will be responsible for recording this AGREEMENT with the Thurston County Auditor or may request that all Parties post this AGREEMENT on their websites as allowed under RCW 39.34.040.

***** Signatures on the Following Page *****

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CITY OF LACEY

By: _____

Scott Spence, City Manager

ATTEST:

Carol Litten, City Clerk

APPROVED AS TO FORM:

David Schneider, City Attorney

CITY OF OLYMPIA

By: _____

Steven R. Hall, City Manager

ATTEST:

Debbie Sullivan, City Clerk

APPROVED AS TO FORM:

Annaliese Harksen, Deputy City Attorney

LOTT Clean Water Alliance

By: _____

Cynthia Pratt, Board President

CITY OF TUMWATER

By: _____

Peter Kmet, Mayor

ATTEST:

Melody Valiant, City Clerk

APPROVED AS TO FORM:

Karen Kirkpatrick, City Attorney

THURSTON COUNTY

By: _____

Ramiro Chavez, County Manager

ATTEST:

La Bonita Bowmar, Clerk of the Board

APPROVED AS TO FORM:

Jon Tunheim, Deputy Prosecuting Attorney

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ATTEST:

Maegen McAuliffe, Corporate Secretary

APPROVED AS TO FORM:

_____, *LOTT Attorney*

ADDENDUM: 2021 UPDATED TOILET REBATE RULES

13. Addendum: 2021 Updated Toilet Rebate Rules

Ultra High-Efficiency Toilets and High Efficiency Toilets

Replacing high-flow toilets with ultra high-efficiency toilets (UHETs) offers water savings in residential and many commercial applications. LOTT defines UHETs as those classified as meeting MaP PREMIUM specification, with a minimum MaP score of 600 and a maximum flush volume of 1.1 gallons.

Toilets installed prior to 1994 use between 3.5 and 5 gallons per flush (gpf). In 1994, toilets were regulated so that only those flushing at 1.6 gpf or less could be sold (EPA 832-F-00-047). A new law effective January 1, 2021, will ensure that toilets sold in Washington State meet a new efficiency standard of 1.28 gpf or less (RCW 19.260.040; California Energy Commission. April 2015).

Beginning July 1, 2021, LOTT will only rebate for toilets that replace toilets with 1.6 gpf or greater and that comply with the MaP PREMIUM standard, for most applications. Exceptions may be made for some commercial customers replacing 1.6 gpf or greater toilets with toilets that flush at 1.28 gpf or less and with a minimum MaP score of 750. Exceptions will be evaluated on a case-by-case basis and will consider the following: requirement for a flushometer style toilet, lack of supplemental water from showers, dishwashers, clothes washers or other appliances, and lack of adequately sloped sewer lines.

During previous planning periods, LOTT implemented a variety of incentives for installing water saving toilets depending on the customer category, number of toilets being replaced, and the flush volume of the toilets being replaced. Project implementation became unduly complicated and onerous, not only for LOTT and city utility staff, but also for the customers. The intent for the 2019-2024 planning period was to simplify implementation, reducing the number of different projects and clarifying implementation guidelines. Three ways to obtain rebates will be offered, providing incentive for toilet replacements across all customer categories:

3. UHET rebates for residential and many commercial applications (hotels, motels, restaurants)
4. HET rebates for commercial applications (those without supplemental water usage)
5. WaterSmart Technology rebates

The applicable rebate type will depend on the category of customer, whether they are replacing an existing fixture, water usage of the existing fixture, and in some cases, the number of toilets to be replaced and the customer's preference for implementation. Table 1 summarizes the applicable project types for various customer categories and scenarios.

ADDENDUM: 2021 UPDATED TOILET REBATE RULES

Table 1: Applicable Toilet Projects per Customer Category and Scenario

PROJECT	CUSTOMER CATEGORY	
	SF and MF Residential	ICI
UHET: Replace 1.6 gpf or greater toilets with MaP PREMIUM toilet (flushes 1.1 gpf or less and has a MaP score of at least 600)	Rebate – \$100	Rebate – \$100 or WaterSmart rebate* – up to 75% installed costs (*if replacing 3.5 gpf or greater toilet)
HET: Replace 1.6 gpf or greater toilets with HET toilet (flushes 1.28 gpf or less and has a MaP score of at least 750) where commercial business has no supplemental water usage. <i>Pre-approval strongly suggested</i>	Does not apply	Rebate – \$100 or WaterSmart rebate* – up to 75% installed costs (*if replacing 3.5 gpf or greater toilet)

Ultra High-Efficiency Toilet Rebates

This is a flat rate rebate project that provides a uniform rebate for the purchase and installation of qualifying UHETs, regardless of customer category. The rebate can be redeemed for up to \$100 per qualifying toilet; qualifying toilets purchased for less than \$100 will be rebated at the purchase price, plus applicable sales tax. This rebate applies to:

5. SF residential customers replacing toilets with flush volumes of 1.6 gpf or greater.
6. MF residential customers replacing toilets with flush volumes of 1.6 gpf or greater.
7. ICI customers who have supplemental water flow (such as showers, dishwashers, or clothes washers) and who are replacing 1.6 gpf or greater toilets. ICI customers replacing older toilets that use 3.5 gpf or greater may elect to apply for this type of rebate or apply for funding under WaterSmart. ICI customers who do not have supplemental water flow are still eligible for the rebate for HETs with a MaP score of 750 and maximum flush of 1.28 gpf.

PROJECT	FLOW REDUCTION
SF UHET	17.3 gallons/day/household
MF UHET	12.0 gallons/day/household

ADDENDUM: 2021 UPDATED TOILET REBATE RULES

ICI UHET	31.8 gallons/day/toilet
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Water Savings Assumptions

The number of gallons saved for any specific installation of a UHET will vary depending on the flush volume of the fixtures being replaced, flush volume of the new fixtures, number of people using the fixture, and frequency of use. Because of these variable factors, it is not possible to calculate exact water savings for each program participant. The following standard assumptions are applied to the various customer categories to estimate water savings associated with installation of UHETs:

1. SF – Installing UHETs is estimated to reduce flows by an average of 17.3 gpd. Flow reduction is calculated by subtracting the number of gallons used per day with a UHET (MaP PREMIUM) from the gallons used per day with a standard existing toilet. The assumptions below were used:
 - a. 5.0 flushes per day per person (WRF, 2016)
 - b. 2.3 persons per household (LOTT, 2016)
 - c. 2.6 gpf average flush (WRF, 2016; the average flush in a US-Canada survey was found to be 2.6 gpf.)
 - d. 1.1 gpf per new fixture
2. MF – Installing UHETs is estimated to reduce flows by an average of 12.0 gpd:
 - a. 5.0 flushes per day per person (WRF, 2016)
 - b. 1.6 persons per household (LOTT, 2016)
 - c. 2.6 gpf average flush (WRF, 2016)
 - d. 1.1 gpf per new fixture
3. ICI – Installing UHETs is estimated to reduce flows by an average of 31.8 gpd. This average takes into account the proportion of older and newer toilets with varying flush volumes and the average number of flushes expected in ICI settings. **ICI customers replacing older toilets with flush volumes of 3.5 gpf or greater can maximize their rebate by applying through the WaterSmart Technology rebate project.**

The average flow reduction for ICI toilets is an estimate derived by the committee because the two existing studies on ICI toilets, both from California, were found to be lacking.

ADDENDUM: 2021 UPDATED TOILET REBATE RULES

In the first study, the Commercial, Industrial, Institutional Ultra Low Flow Toilet Savings Study by the California Urban Water Conservation Council (1997), a range of savings between 16-57 gpd was identified for the installation of 1.6 gpf toilets, but very little detail was given on how those numbers were derived. This study was used in the 2013-2018 Water Conservation Coordination Plan. To determine gpd saved for the ICI category, the committee obtained an average from the range, and then used a multiplier to account for the fact that the new toilets were 1.28 gpf instead of 1.6 gpf, arriving at a value of 45 gpd for replacement of older 3.5 gpf toilets, and 14 gpd for 1.6 gpf toilets.

The second study was a more recent reference report from Pacific Gas and Electric (2013). It estimated that the number of average flushes per day for each commercial toilet was 5.9, based on broad assumptions on the number of commercial toilets in California, the number of workers using those toilets, the ratio of men to women in the workplace, and the assumption that urinals were available for male employees. Using 5.9 flushes per toilet, the average water savings for replacing existing toilets with UHETs would be 8.3 gpd per toilet. Because the range of water savings from these two reports differed so much, the committee used data from LOTT's WaterSmart Technology rebate project to verify assumptions and check the numbers.

Data from all three cities for 2010-2016 WaterSmart toilet replacement projects was compiled into a sample set of 24 projects with 388 toilets. These data showed that ICI toilets were flushed an average of 21.2 times per day. While using data from the WaterSmart project may over-estimate the number of flushes per toilet, it was assumed that other businesses would also focus on replacing toilets with frequent usage. Further calculation for ICI toilets puts the water savings at 33.9 gpd. Since this number falls between the estimates of the previous studies, the committee decided that the derived number could be used to estimate water savings of ICI toilets. The following assumptions were used in the calculation:

- a. 21.2 flushes per day per ICI toilet
- b. 2.6 gpf average flush (WRF, 2016)
- c. 1.1 gpf per new fixture

ADDENDUM: 2021 UPDATED TOILET REBATE RULES

Implementation Guidelines

1. Rebates will only be provided for purchase of qualifying UHETs. Qualifying criteria includes:
 - a. Toilet must have a flush volume of 1.1 gpf or less.
 - b. Toilet must score a minimum of 600 grams on MaP performance testing, also known as being rated MaP PREMIUM (<https://www.map-testing.com/map-premium.html>)
 - c. Dual flush toilets are not eligible for rebate unless the model has a maximum flush volume of 1.1 gallons or less and is installed in a SF residence. The installation of pressure assisted dual flush toilets are discouraged due to performance issues.
 - d. Only complete toilet fixtures are eligible for rebate. Equipment intended to retrofit an existing toilet fixture is not eligible for rebate.
2. Rebates are intended to replace 1.6 gpf or greater toilets.
3. SF customers are eligible for a maximum of three rebates per household, based on the number of fixtures in the home.
4. Customers must apply for rebate within six months of the date of purchase.
5. UHETs installed at rental properties are also eligible for rebate. The rebate will be provided to the property owner or the renter, whoever purchases the qualifying toilet, as long as it is installed at a property receiving LOTT sewer service, and its installation is approved by the property owner.
6. Rebates will not be provided for MaP PREMIUM toilets intended to replace toilets flushing at 1.28 gpf or less. Replacing a 1.28 gpf toilet with a 1.1 gpf toilet does not meet LOTT's cost-effectiveness threshold.
7. Rebates will not be provided for MaP PREMIUM toilets intended to replace other MaP PREMIUM toilets.
8. Rebates will not be provided for installation addresses where three LOTT incentives have previously been provided for toilets that flush at 1.28 gpf or less.

ADDENDUM: 2021 UPDATED TOILET REBATE RULES

Process for Participation

To receive a rebate, customers must purchase a qualifying UHET that meets the criteria listed above. To apply for rebate, customers must submit the following to LOTT:

1. Completed LOTT rebate application
2. Copy of city water/sewer bill
3. Copy of toilet purchase receipt with the toilet model or item number(s), purchase price, date of purchase, and proof of payment

LOTT staff confirm eligibility and issue rebate checks for rebate requests that meet eligibility requirements. LOTT staff occasionally need to contact partner water utilities to confirm LOTT sewer account status if a customer cannot provide a copy of their bill. In cases where there may be questions regarding customer sewer account status or installation location, partner utility staff may be asked to confirm installation prior to final rebate processing.

Cost-Effectiveness:

UHET Rebates (SF, MF)

To calculate the cost savings for replacing a less efficient toilet with a qualifying UHET (MaP PREMIUM), the difference in gpf was calculated between the two toilets, taking into consideration the flush volume of the toilets and the number of people in the household.

ASSUMPTIONS	
Flushes per person per day (WRF, 2016)	5.0
Average gallons used per flush (calculated based on WRF, 2016)	2.6
Average number of persons per SF household (LOTT, 2016)	2.3
Average number of persons per MF household (LOTT, 2016)	1.6

FORMULAS	CALCULATIONS
SF $((5.0)(2.3)(2.6)) - ((5.0)(2.3)(1.1)) = 17.3$	17.3 gallons/day/household
MF $((5.0)(1.6)(2.6)) - ((5.0)(1.6)(1.1)) = 12.0$	12.0 gallons/day/household
COST-EFFECTIVENESS	
SF \$100 cost of rebate/17.3 gpd saved	\$5.8 per gallon saved
MF \$100 cost of rebate/12.0 gpd saved	\$8.3 per gallon saved

ADDENDUM: 2021 UPDATED TOILET REBATE RULES

UHET Rebates (ICI)

To calculate the cost savings for replacing a less efficient toilet with a qualifying UHET (MaP PREMIUM), the difference in gpf was calculated between the two toilets, taking into consideration the flush volume of the toilets and the number of times the toilet is flushed. Because of the wide variation in types of businesses, toilets per business, number of employees per business, and the number of visitors per business, the two estimates found the literature for number of flushes per toilet in an ICI setting varied greatly. LOTT used its WaterSmart toilet replacement project to determine average number of flushes per day for local businesses. Formulas are shown for replacing a toilet with an average flush volume.

FORMULAS	CALCULATIONS
$ICI ((21.2) (2.6)) - ((21.2) (1.1)) = 31.8$	31.8 gallons/day/toilet

COST-EFFECTIVENESS	
ICI \$100 cost of rebate/31.8 gpd saved	\$3.1 per gallon saved

References

California Energy Commission. April 2015. Appliance Efficiency Regulations. California Code of Regulations Title 20, Sections 1601 Through 1608 Toilets, Urinals, and Faucets Regulations Effective January 1, 2016. CEC---400---2015---015---CMF

EPA 832-F-00-047: September 2000. Wastewater Technology Fact Sheet High-Efficiency Toilets.

RCW 19.260.040; 15 h. <https://apps.leg.wa.gov/rcw/default.aspx?cite=19.260.040>. Accessed 11/3/2020.



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