



Boise School District: School Lead Risk Mitigation & Water Conservation Project

SRF Loan #WW1902

\$500,000

Green Project Reserve Final GPR Justification

Categorical GPR Documentation

REPLACES LEAD SERVICE LINES, AND FIXTURES IN SCHOOLS (Water Efficiency). Business Case GPR per the criteria requirements of 2.1 *...use of improved technologies and practices to deliver equal or better services with less water*; also, per 2.2-1 *Installing or retrofitting water efficient devices such as plumbing fixtures...*; also per 2.2-1a... *plumbing devices*; 2.2-1c *WaterSense labeled products*; also 2.4-1 *Water efficiency can be accomplished through water saving elements or reducing water consumption.* (\$500,000)

GAC Filters & Replacement Fixtures

Summary

The Boise School District detected lead in the drinking water of some schools constructed prior to 1986 and undertook a rigorous program to address the issue. In addition to removing the old fixtures and installing lead-free, water-efficient fixtures, the program considered installing GAC filters at select locations.

- Estimated funding amount = \$500,000
- Estimated energy efficient (green) portion of funding = \$500,000 (100%)

Background

- The Boise School District implemented a program to replace water faucets/fixtures and fountains/bubblers for 27 schools constructed prior to 1986. At three schools where water lines currently dead-end at the school, the program considered installing GAC filters to eliminate daily flushing of lines and fixtures. Both of these initiatives provide a significant water efficiency benefit to the public water system.
- The program also included taking test samples at each of the 27 schools identified for potential lead in the school's drinking water, and having the samples analyzed by the Idaho State Test Lab.

GPR Eligibility

The Boise School District project was SRF-eligible and GPR-eligible as it resulted in a considerable water conservation benefit to the public water system through (1) flow reduction by installing new water-efficient fixtures, and by (2) eliminating the daily flushing of school lines and fixtures required to reduce lead exposure.

1. NEW WATER-EFFICIENT FIXTURES: WATER CONSERVED

LAVATORY FAUCETS

- Replacement Faucets = 1.2 gpm¹
- Old Faucets = 3.5 gpm²

The Moen replacement lavatory faucets qualify as GPR-eligible as they result in a **65% reduction in the flow rate** compared to the old American Standard faucets.



New Elkay Cooler Fountains LZS8LF/ LZ88WSLK

HALLWAY FOUNTAINS

- Replacement Fountains = .25 gpm³
- Old Fountains = .75 gpm⁴

The replacement Elkay hallway fountains qualify as GPR-eligible as they result in a **66% reduction in the flow rate** compared to the old Elkay fountains.

¹ Moen specification for series 8800 commercial lavatory 2-handle faucet; Watersense certified

² American Standard Faucets pre-1990; Per Vanessa McDowell, Lixil Water Technology Americas, Technical Customer Care Representative; 11-14-2018

³ Ed Locke, Product Manager, Elkay Manufacturing Co.; Elkay Hallway Fountain Model LZS8WSLK; 11-6-18

⁴ BSD maintenance staff test results at 58 psi; manufacturer data unavailable.

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CLASSROOM BUBBLERS

- i. Replacement Bubblers = .50 gpm⁵
- ii. Old Bubblers = 1.25 gpm⁶

The replacement Chicago Faucets classroom bubblers qualify as GPR-eligible as they result in a **60% reduction in flow rate** compared to the old Chicago Faucets bubblers.



New Chicago Faucets
Classroom Bubbler
Model 748-665ABCP

KITCHEN FAUCETS

- i. Replacement Faucets = 1.5 gpm⁷
- ii. Old Kitchen Faucets = 4.5 gpm⁸

The replacement Moen Chateau kitchen model 7425 faucets qualify as GPR-eligible as they result in at least a **66% reduction in flow rate** compared to the old kitchen faucets.



New Moen Chateau
Kitchen Faucet
Model 7425



New Moen Chateau
Kitchen Faucet
Model 7423

- i. Replacement Faucets = 1.5 gpm⁷
- ii. Old Kitchen Faucets = 4.5 gpm⁸

The replacement Moen Chateau kitchen Model 7423 faucets qualify as GPR-eligible as they result in at least a **66% reduction in flow rate** compared to the old kitchen faucets.

TABLE 1. SUMMARY OF WATER SAVINGS FROM REPLACEMENT FAUCETS

Fixture	Type/ Manufacturer of Replacement Faucet	Efficiency Rating or Flow (gpm) of New Faucet	Old Faucet* to be Replaced by New Model	Number of Each type to be Replaced	Flow (gpm) of Old Faucet ⁸	Water Savings (gpm)
Lavatory	Moen-Bition	1.20	American Standard	489	3.50	2.30
Fountain	Elkay Cooler	0.25	Elkay	168	0.75	0.50
Bubbler	Chicago Faucets	0.50	Chicago Faucets	309	1.25	0.75
Kitchen	Moen Chateau	1.50	American Standard	631	4.50	3.00
			Total	1,597		

* Fixtures are all pre-1984 (the schools in the leaded fixture replacement program were constructed from 1903 through 1984)

⁵ BSD maintenance staff tested Model 748-665ABCP at 58 psi. Matt Gilbert, Product Manager, Woodruff, reported 0.74 gpm.

⁶ BSD maintenance staff test results, measured at 58 psi.

⁷ Moen specifications for model 7425 and 7423 single handle faucets; meets CalGreen and Georgia SB370 requirements.

⁸ Flow of old fixtures measured in situ at 58 psi by the District with the exception of Kitchen faucets, whose estimated flow was per *Water Efficiency Management Guide Residential Kitchen and Laundry*, EPA 832-F-016b, November 2017, page 1: pre-1992 kitchen faucet flow range from 3 to 7 gpm.

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2. ELIMINATION OF FLUSHING: WATER CONSERVATION

Flushing lines and fixtures is a primary management strategy to reduce lead exposure in drinking water systems with detectable levels of lead. Table 2 outlines the *3Ts Flushing Instructions Best Practices* published by the EPA⁹.

TABLE 2. 3Ts FLUSHING INSTRUCTIONS BEST PRACTICES

<p>Remember that each drinking water outlet should be flushed individually; flushing a toilet will not flush your water fountains. All flushing should be recorded in a log submitted daily to the office, or person, in charge of this program.</p> <ul style="list-style-type: none"> • Locate the faucet furthest away from the service line on each wing and floor of the building, open the faucets wide, and let the water run for 10 minutes. For best results, calculate the volume of the plumbing and the flow rate at the tap and adjust the flushing time accordingly. This 10-minute time frame is considered adequate for most buildings. • Open valves at all drinking water fountains without refrigeration units and let the water run for roughly 30 seconds to one minute, or until cold. • Let the water run on all refrigerated water fountains for 15 minutes. Because of the long time period required, routinely flushing refrigerated fountains may not be feasible. It may therefore be necessary, and more economical, to replace these outlets with lead-free, NSF-approved devices. • Open all kitchen faucets (and other faucets where water will be used for drinking and/or cooking) and let the water run for 30 seconds to one minute, or until cold.

WATER CONSERVED BY ELIMINATING FIXTURE FLUSHING BY INSTALLING NEW FIXTURES

- With new drinking water fixtures, the District will no long need daily flushing of individual fixtures.
- Water conserved by eliminating flushing is reported in Table 3, and is based on flushing through the old fixtures for 1 minute twice a day for 176 instructional days in a typical school year.

TABLE 3. WATER CONSERVED BY ELIMINATING DAILY FIXTURE FLUSHING

Type of Fixture	Kitchen Faucets	Lavatory Faucets	Drinking Fountains	Classroom Bubblers	Total Conserved (gal/year)
Number of each type	631	489	168	309	
Discharge Rate of Old Fixture	4.50 gpm	3.50 gpm	0.75 gpm	1.25 gpm	
Water Conserved/year	1,000,000 gal	600,000 gal	40,000 gal	135,000 gal	1,775,000

Installing new fixtures saves the public water system - just through eliminating flushing alone - approximately **1,775,000 gallons every year**.

Summary

New water fixtures use 60% to 66% less water than the old water fixtures they replaced in the Boise School District Schools, resulting in considerable water conservation for the public water system.

In addition, the new water fixtures save an additional approximate 1.8 million gallons of water every year by eliminating daily fixture and water line flushing.

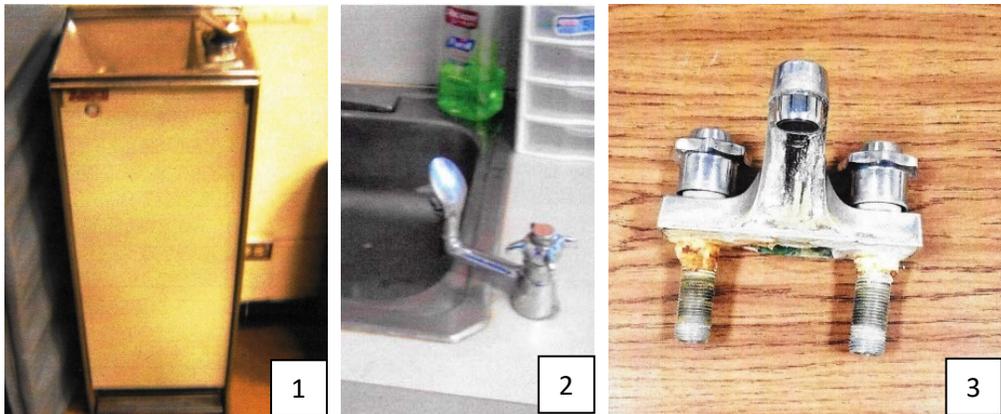
⁹ Per USEPA Best Practices https://www.epa.gov/sites/production/files/2018-09/documents/flushing_best_practices_factsheet_508.pdf

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Conclusion

- GAC filters and faucet upgrades conserve water and remove the risk of lead particles in soldered fountains and fixtures in the District's older schools.
- The Boise School District's replacement of leaded drinking water fixtures is eligible for SRF funding and Green Project Reserve status as they *provide a water efficiency benefit to the public water system*.
- **GPR Costs:** Leaded lines, fixtures, and appurtenance replacement = \$500,000
- **GPR Justification:** Replacement of leaded drinking water fixtures is Categorically GPR-eligible (Water Efficiency) per the criteria requirements of 2.1 *...use of improved technologies and practices to deliver equal or better services with less water*; also, per 2.2-1 *Installing or retrofitting water efficient devices such as plumbing fixtures...*; also per 2.2-1a... *plumbing devices*; 2.2-1c *WaterSense labeled products*; also 2.4-1 *Water efficiency can be accomplished through water saving elements or reducing water consumption*¹⁰.

Below: old inefficient fixtures (left to right): (1) hallway fountain, (2) classroom bubbler, (3) lavatory faucet.



¹⁰ April 21, 2010 EPA Guidance for Determining Project Eligibility. Attachment 2. Part B - DWSRF GPR Specific Guidance. pps 16 - 18.