

Example: LEED IWUR – Water Usage for Flush Fixtures

A new commercial office building is planned for occupancy of 200. The business employs 75% full-time and 25% half-time employees. The business will have no visitors. The number of workdays each year is 275. The owner will install WaterSense® Water Closets in all lavatories and WaterSense® Urinals in male lavatories. No other strategies to reduce potable water use for sewage conveyance are being employed.

1. Calculate the BASELINE Daily and Annual Water Usage for Flush Fixtures [gal]
2. Calculate the DESIGN case Daily and Annual Water Usage for Flush Fixtures [gal]
3. Calculate the percentage reduction in Annual Water Usage for Flush Fixtures [gal]
4. What is the minimum volume of rainwater or graywater that would need to be captured and used for this project to reduce the potable water use for sewage conveyance to 75%?

Solution.

Determine the FTE for the building.

$$200 \times 75\% = 150 \text{ FTE (8 hours/day)}$$

$$200 \times 25\% = 50 \text{ part-time (4 hours/day) (50 part-time} \times 4 \text{ hrs/day)/8 hrs} = 25 \text{ FTE}$$

$$\text{Total FTE} = 175$$

Q#1. Baseline Daily and Annual Water Consumption for Flush Fixtures

Flush Fixture	Flushrate (gpf)	Duration	Users	Uses per person per day	Water Consumption (gal)
Water closet (Male)	1.6	1	87.5	1	140
Water closet (Female)	1.6	1	87.5	3	420
Urinal (Male)	1.0	1	87.5	2	175
Total Daily Water Consumption for Flush Fixtures (GAL)					735
Annual Work Days					275
Total Annual Water Consumption for Flush Fixtures (GAL)					202,125

Q#2. Design Daily and Annual Water Consumption for Flush Fixtures

Flush Fixture	Flushrate (gpf)	Duration	Users	Uses per person per day	Water Consumption (gal)
Water closet (Male)	1.28	1	87.5	1	112
Water closet (Female)	1.28	1	87.5	3	336
Urinal (Male)	0.5	1	87.5	2	87.5
Total Daily Water Consumption for Flush Fixtures (GAL)					535.5
Annual Work Days					275
Total Annual Water Consumption for Flush Fixtures (GAL)					147,263

Q#3.

$$\text{Percent Reduction Annual Water Consumption for Flush Fixtures} = (1 - 147,263/202,125) \times 100 = \mathbf{27\%}$$

Q#4.

To reduce potable water use for flush fixtures by 75% the project can use only 25% of the baseline water use.

$$\text{Total Potable Water Use for Flush Fixtures} = 202,125 \text{ gal} \times 0.25 = 50,531 \text{ gal}$$

$$\text{Volume of Rainwater or Graywater Required} = 147,263 \text{ gal} - 50,531 \text{ gal} = \mathbf{96,732 \text{ gal}}$$