Water Conservation

Green and Healthy Strategies for
Multi Family Properties
Prepared with Assistance from:
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Water Facts

- The World's Water by the Numbers
  - 97% = oceans
  - 2% = glaciers
  - 1% = suitable for drinking
- 1/3 of US lakes, streams and rivers are unsafe for swimming and fishing
- 242 Million people in the U.S. rely on public water supplies for domestic use
  - This represents 85% of the U.S. population in 2000
- The national average daily water consumption per person is 60-70 gallons per day
- If total commercial building water consumption fell by just 10%, we'd save more than 2 trillion gallons of water each year

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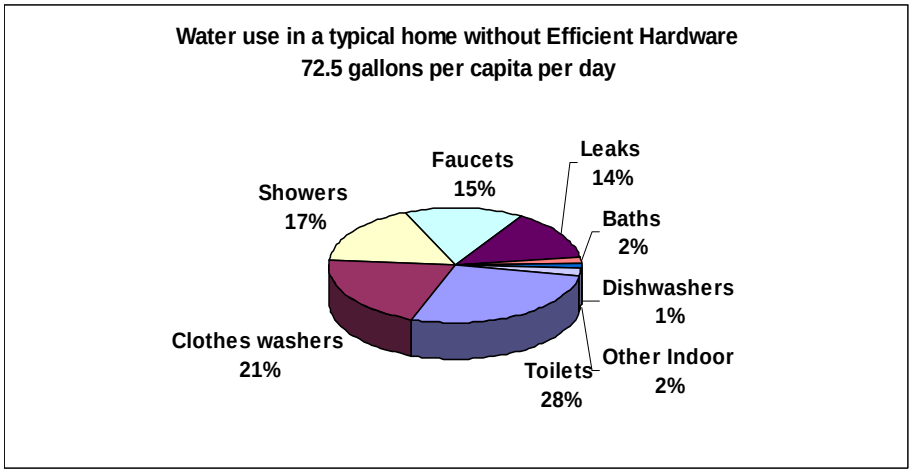
How much do we use?



Source: NYC D.E.P

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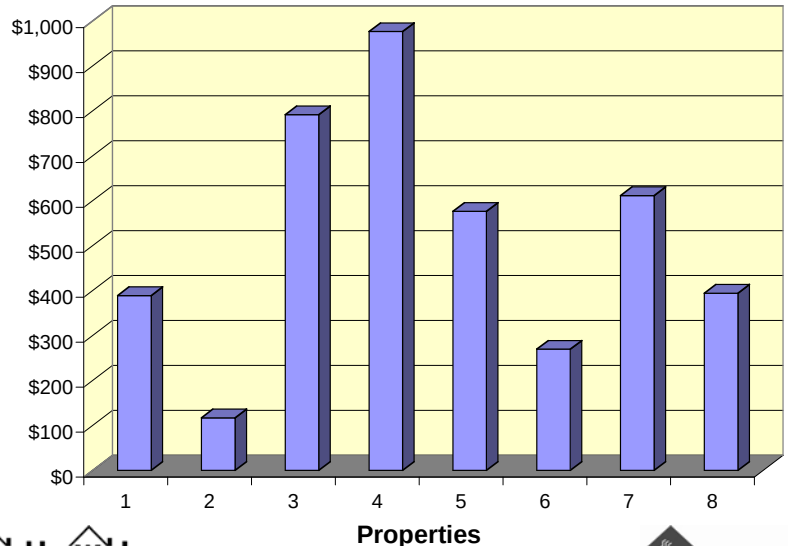
Boston Water $/Unit/Yr – 8:1 Ratio



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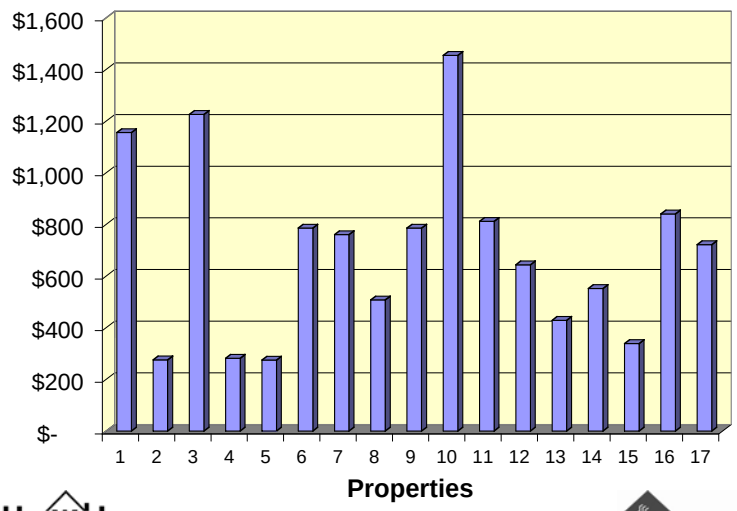
Winn Water $/Unit/Year – 5:1 Ratio



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Water Consumption & Costs

	High	Low
Gallons/Person/Day	**114 GPD**	**42 GPD**
$/Unit/Year	**$1,442**	**$117**

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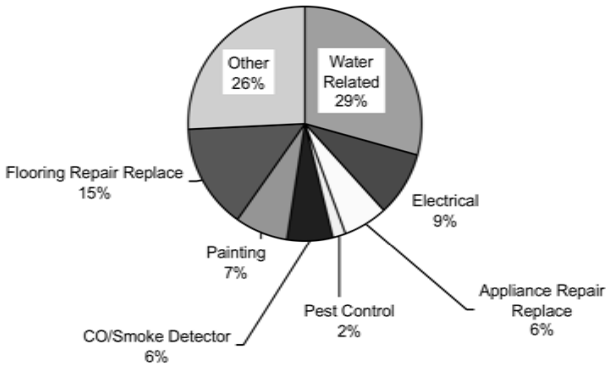
JP Apartment Work Orders



- Water Related
- Electrical
- Appliance Repair Replace
- Pest Control
- CO/Smoke Detector
- Painting
- Flooring Repair Replace
- Other

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Water Savings: Multi Family

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Toilets

- Pre-1980 models use 4-7 gallons per flush (gpf)
- 1980-1992 models typically use 3.5 gpm
- New models flush at 1.6 gpf or less
- Consult Consumer Reports and DEP documentation
- Try one out first in your house
- Install a few in the building and check reaction

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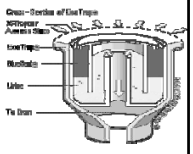
Toilets

How to cut toilet water consumption:

1. Switch to 1.6 GPF (if you haven't already)
2. Replace Flappers
3. Consider Dual-flush, or low flush toilets as low as 0.8 GPF
4. Consider Waterless Urinals

Ultra Dual Flush
Backoutlet
1.1 / 1.6 gpf



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Maximum Performance Testing

- Joint study between US and Canada
  - California Urban Water Conservation Council
  - Canadian Water and Wastewater Association
- 13th Edition 2009

http://www.cuwcc.org/MapTesting.lasso

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MaP Testing Results

- Performance ranged from 75g to 1,000g (<250g fail)
- Early tests had 45% failure rate
- Current Edition: <5% fail rate
- Flapper replacement can significantly impact total water usage (by 50% or more)
- New EPA WaterSense Label
  - HET 1.3 gpf
  - 350g performance minimum

http://www.cuwcc.org/MapTesting.lasso

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HET Technology: Dual Flush

User Choose:

- 0.8 GPF "Short Flush"
- 1.6 GPF "Full Flush"

- Average flush volume between 1.1 – 1.25 gallons

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Showers

- Some measured at over 12 gallons per min (gpm), average range is 4-7 gpm
- Typical Low flow models use 2.5 gpm or less but you can get 1.5
- Many inexpensive low flow models are great
- Consult Consumer Reports
- Install a few and check reaction
- Don't install one that you haven't used at your own house
- Check water pressure, low pressure can be challenging

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The Bathroom Sink

- Primarily used for hand-washing and tooth-brushing
- Without aerator can be 5 gpm (brushing teeth 1 min, with water on – 5 gallons down the drain)
- Most lavatory and bathroom applications can easily get by on 0.5 gpm

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Sinks for Washing Dishes

- Average faucet uses 1.5 – 5.0 gpm
- Sinks should have flows of under 2.2 gpm, many can get by on 1.5 or less
- Water temperatures should be reduced to 120º F at the point of delivery or per local code

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EPA WaterSense Program

- WaterSense will help consumers identify water-efficient products and programs
- Labeled products will perform well, help save money, and encourage innovation in manufacturing
- Labeled products will be about 20 % more water efficient than their less efficient counterparts in the same category

Leaks

- 1 drip per second = 5 gallons per day
- Hot water leaks waste water and energy
- Recent AWWA report suggests that leaks account for 13.7% of household water use
- Severity of leaks can best be found by looking at your water meter at 2am
  - Water running at that time is typically from leaks

Abatement Metering

- Avoid unnecessary sewer charges from metering:
  - Irrigation water
  - Steam condensate being reused
  - Any water that is not being dumped back into the sewer that your are charged for

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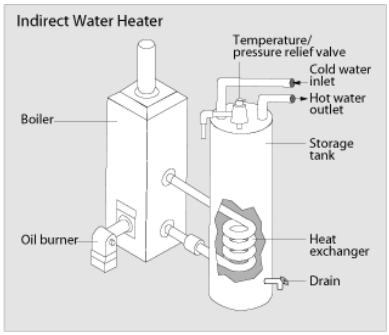
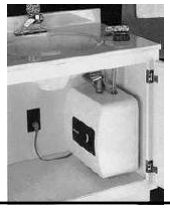
DHW Systems

- Good strategies
  - On demand hot water
  - Sealed combustion indirect water heater
  - Separate smaller boiler for DHW in the summer time
- Not so good strategies

  Instantaneous water heaters
  - Electric
  - Gas





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Minimum. temp. requirements – Domestic Hot water

- Look for a range of 120-125 degrees F at the point of delivery
- Codes
  - Some require you go down to 120 to protect from scalding
  - Others require you don't go lower than 125 to prevent bacteria growth
  - 137º F water burns human skin and is dangerously hot
- ***Know your local codes***

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Typical hot water makers

- Inefficient
- Short life
- Can spill or backdraft products of combustion
- Notorious for carbon monoxide production

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Alternatives:

- Small boilers with storage
- Sealed combustion units with furnace (one piece units)
- Larger buildings: running off boiler

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Checklist

- **Water:**
  Conserving This Precious Resource
  Feature - *Environmental Building News* September 1997
- **Water Conservation Checklist**
- ***INDOORS***
- **1. Repair leaks**—Carefully examine plumbing for dripping faucets, toilets that continue running, and leaky pipes. The building's water meter (if there is one) can be used to identify leaks—take readings before and after a two-hour period when no water is being used (there should be no change). On well-water systems, a frequently running pump is a sign that there may be a leak in the system. Repair any leaks or faulty fixtures.
- **2. Repair or replace toilets**—Repair flappers for a low cost solution to saving water. Replace older toilets with new, 1.6 gpf (6 liter) models. Highest priority should be those toilets that are used the most or leak. Less effective, but better than nothing, is installing toilet dams or displacement devices (usually plastic jugs filled with water) in the tank to reduce the flush volume.
- **3. Install low-flow showerheads**—Replace existing shower-heads with low-flow models. Models that permit the users to reduce the flow without changing the hot-cold mix allow even greater savings.
- **4. Add low-flow faucet aerators**—Flow-restricting faucet aerators providing 2.5 gpm (9.5 lpm) are appropriate for kitchens; models providing 1.0 gpm (3.8 lpm) usually suffice in bathrooms.
- **5. Install water-conserving clothes washers and dishwashers**—Purchase state-of-the-art clothes washers and dishwashers. The best clothes washers are front-loading (horizontal-axis). Water-conserving dishwashers have advanced circuitry that determines the water use based on how soiled the dishes are.

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Checklist

- **6. Avoid in-sink garbage disposals**—Kitchen sink garbage disposals require a lot of water to operate, and they overload sewage treatment plants or in-ground septic systems with organic matter.
- **7. Insulate water pipes**—By insulating hot water pipes, water in the pipes will stay warm longer between uses; the user won't have to run water as long to get hot water, and waste will be reduced. A device to cycle water back to the water heater during warm-up will even more effectively reduce this waste (see *EBN* **Vol. 4, No. 2**). Avoid systems that circulate water continuously to keep hot water at the tap—these waste a lot of energy.
- **8. Reduce water pressure**—If a building has water pressure in excess of 60 psi (414 kPa), it may make sense to reduce that pressure to 40-50 psi (276-345 kPa) to lessen the likelihood of leaks. Pressure reducing valves can be installed on individual buildings, or the municipality can be approached about lowering the pressure over a larger area.
- **9. Plumb buildings for graywater separation**—Even if local building codes do not yet permit graywater separation and use, it makes sense to plumb wastewater lines so that a graywater system can later be added easily (see *EBN* **Vol. 4, No. 2**).
- **10. Consider rainwater harvesting** —Rainwater collection systems for potable water make sense in some locations and situations. Careful roof-wash, filtration, and purification systems are required to ensure safe drinking water (see *EBN* **Vol. 6, No. 5**).

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- **11. Consider dual plumbing for water reuse**—In certain buildings it may make sense to provide dual plumbing so that recovered water can be used for toilet flushing. California now promotes this practice.
- **12. Design more efficient evaporative cooling systems**—In commercial and industrial buildings, evaporative cooling towers can use significant amounts of water through evaporation and blowdown (in which some of the recirculating water is flushed to get rid of dissolved solids). More water-efficient systems are available.
- **13. Educate building occupants**—Provide homeowners or commercial building occupants with information about water conservation. Include specific information on how to use appliances and plumbing fixtures for maximum water savings. Behavioral changes can dramatically reduce water use in buildings.

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Checklist

- ***OUTDOORS***
- **1. Minimize lawn area** —Lawns are not only high water consumers, but they also often require significant use of fertilizers and pesticides, and mowing generates air pollution.
- **2. Plant climate-appropriate turf grass**—For areas that are planted to lawn, choose a variety of grass that is well adapted to your climate. In hot, arid areas, the native buffalo grass (Buchloë dactyloides) is a good choice. Avoid overfertilizing.
- **3. Use xeriscaping practices**—Xeriscaping (use of drought-tolerant, low-water-demand plants, mulching, and other practices to reduce water use) can dramatically reduce irrigation needs outdoors.
- **4. Avoid watering pavement**—Make sure that sprinkler systems (if used) are designed and positioned properly to put the water only where it is needed.
- **5. Install water-efficient watering systems**—When landscape irrigation is needed, install the most water-efficient systems possible. Micro-irrigation, drip-irrigation, and soaker hoses are examples of more efficient systems. Sprinklers should be timed for early morning and evening operation, when evaporation rates will be the lowest.

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Checklist

- **6. Ensure that automated irrigation systems will be checked regularly**—If installing timers, or a more sophisticated automatic irrigation system, install a rain sensor device or switch that will override the watering system when there is adequate rainfall. Check automated irrigation controls regularly.
- **7. With pools, install water-conserving filters**—Backflush-ing with a conventional swimming pool filter can consume 180 to 250 gallons (680-950 l) of water. Some newer filters require much less water.
- **8. Use graywater for landscape irrigation**—If local building codes allow it, use graywater for below-ground landscape irrigation (see *EBN* **Vol. 4, No. 2**). This will reduce the amount of potable water used for irrigation.
- **9. Use collected rainwater for landscape irrigation**—Very simple rainwater harvesting systems work very well for landscape irrigation. This application can be cost effective even if a full-scale rainwater system for potable water is not.

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