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ENGINEERS

Water Conservation Case Study: Betty Irene Moore Natural Sciences Building at Mills College

March, 2008

Success in Water Efficient Design

- Water efficient measures save approximately 200,000 gallons per year annually on this project
 - Zero water consumption urinals in original design
 - 1/8th gallon per flush urinals installed
 - Dual flush toilets
 - Sensor operated low flow faucets
 - Rainwater catchment
- Minimal investment
- A model for water efficient design



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Zero Water Consumption (ZWC) Urinals

- Each ZWC urinal saves approximately 45,000 gallons of water per year*
- ZWC urinals were not allowed to be used on this project by local code officials
- Currently allowed in Oakland due to California Bill AB-715 (California Toilet Efficiency Law) signed by the Governor in October 2007



ZWC Urinals installed in the Rose Bowl, Pasadena, CA

* per the U.S. Army Corps of Engineers



Pros

- The ultimate in water conservation
- Decreased sanitary sewer outflow
- Elimination of flush valve
 - Reduced maintenance (flush valves are a maintenance issue)
 - Eliminate leaks
 - Eliminate potential of restroom flooding
 - **Lower construction costs**
- Health
 - Increased public restroom hygiene
 - Less moisture = Less bacteria
 - No flush handle for transmission
 - No flush = Reduction of microbial aerosols during flushing
 - No difference in risk to maintenance workers
 - Cartridge trap or sealant more than adequate for prevention of sewer gases



Cons

- ZWCs require a different type of maintenance
 - Periodic cartridge changing (if applicable)
 - The maintenance personnel need to become accustomed to caring for this new urinal.
- Potential Pipe Solids Buildup
- Cost Effectiveness
 - If maintenance costs of replacing cartridges are not carefully followed, cost effectiveness can be a problem



1/8th Gallon per Flush (gpf) Urinal

- During construction, the 1/8th gpf urinal became available
- Acquired Uniform Plumbing Code (UPC) approval so it does not require additional approvals to use.
- Uses only 1/8th gpf
- Construction: Vitreous china



Dual Flush Water Closets

- Flowrate of 1.6 gpf solids and 0.8 gpf liquids
- Average 1.28 gpf
- Considered High Efficiency Toilet (HET) and MaP test score listed on the California Urban Water Conservation Council Website (cuwcc.org)



High Efficiency Toilet and MaP Test Scores

- An HET is a fixture with an average flush volume that is at least 20% below that of a conventional ultra-low-flush toilet (ULFT). The average flush volume is 1.28 gallons per flush or less.
- The MaP test represents evacuating sinking solid waste in a single flush.
- Drainline transport has been cited by some as a concern, as flush volumes are reduced to as low as one gallon, i.e., will clogging and backups occur as water volumes are reduced?
- Using the MaP media and a variety of HET fixtures, the study showed that in all cases there was sufficient water to move the waste beneath a typical residential dwelling to the sewer.

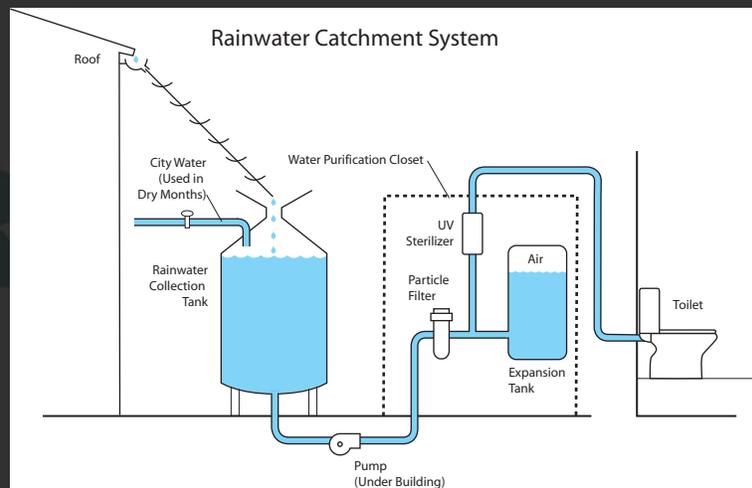


Lavatory Faucets

- Works with ambient light, like a solar-powered calculator.
- 0.5 gpm aerator regulates water flow
- Electronic sensor automatically turns water on/off
- Integral temperature control
- Back –up battery



Rainwater Catchment



Rainwater Sculpture

- Approximately 50,000 to 60,000 gallons of rainwater is used for sewage conveyance offsetting an equal amount of domestic water.



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Outstanding Issues

- Installed a particulate filter to remove particles larger than 5 microns
- Pine pollen, which is approximately 70-85 microns in size, is getting into the toilet tanks and creating a nuisance
- Pine pollen is an issue that needs to be resolved.



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Questions

- Thank you.

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