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Stealthy Students Save Big: UCI Student Housing Retrofit Pilot Study

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Outline for today

Irvine Ranch Water District

-
- IRWD & UCI Partnership
 - Project Scope & Implementation
 - Project Appeal
 - High Performance Plumbing Fixtures
 - Water Savings
 - Benefits
 - Questions



About Irvine Ranch Water District

Irvine Ranch Water District

Water, Wastewater, Water Recycling, Urban Runoff

California Special District governed by a publicly-elected Board

IRWD customer base:

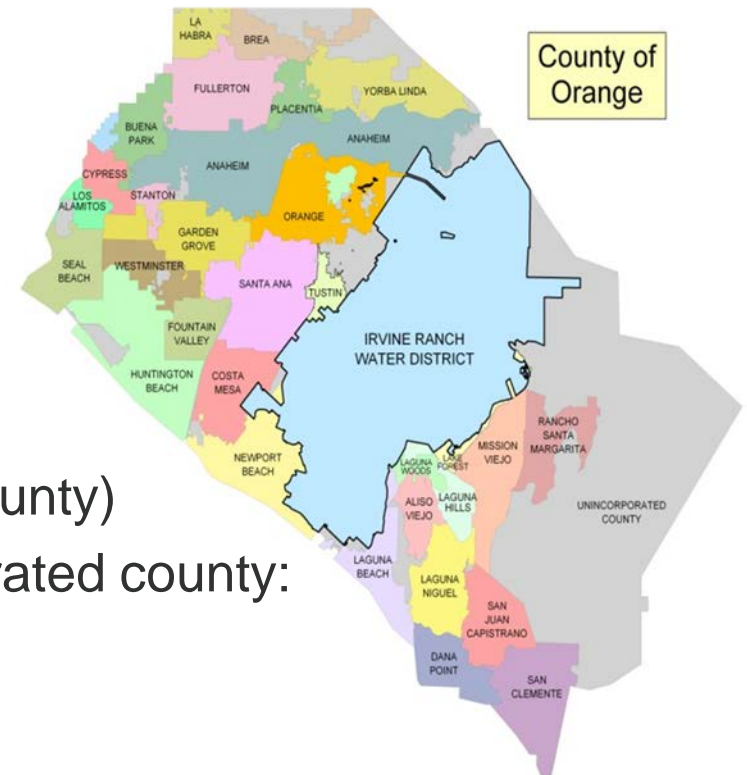
- Residential population: 340,000
- Daytime population: over 500,000
- Service connections: 101,600

IRWD service area:

- 181 square miles (20% of Orange County)
- All or part of **six** cities and unincorporated county:

Irvine
Tustin
Orange

Lake Forest
Newport Beach
Costa Mesa





About the University of California Irvine

Irvine Ranch Water District

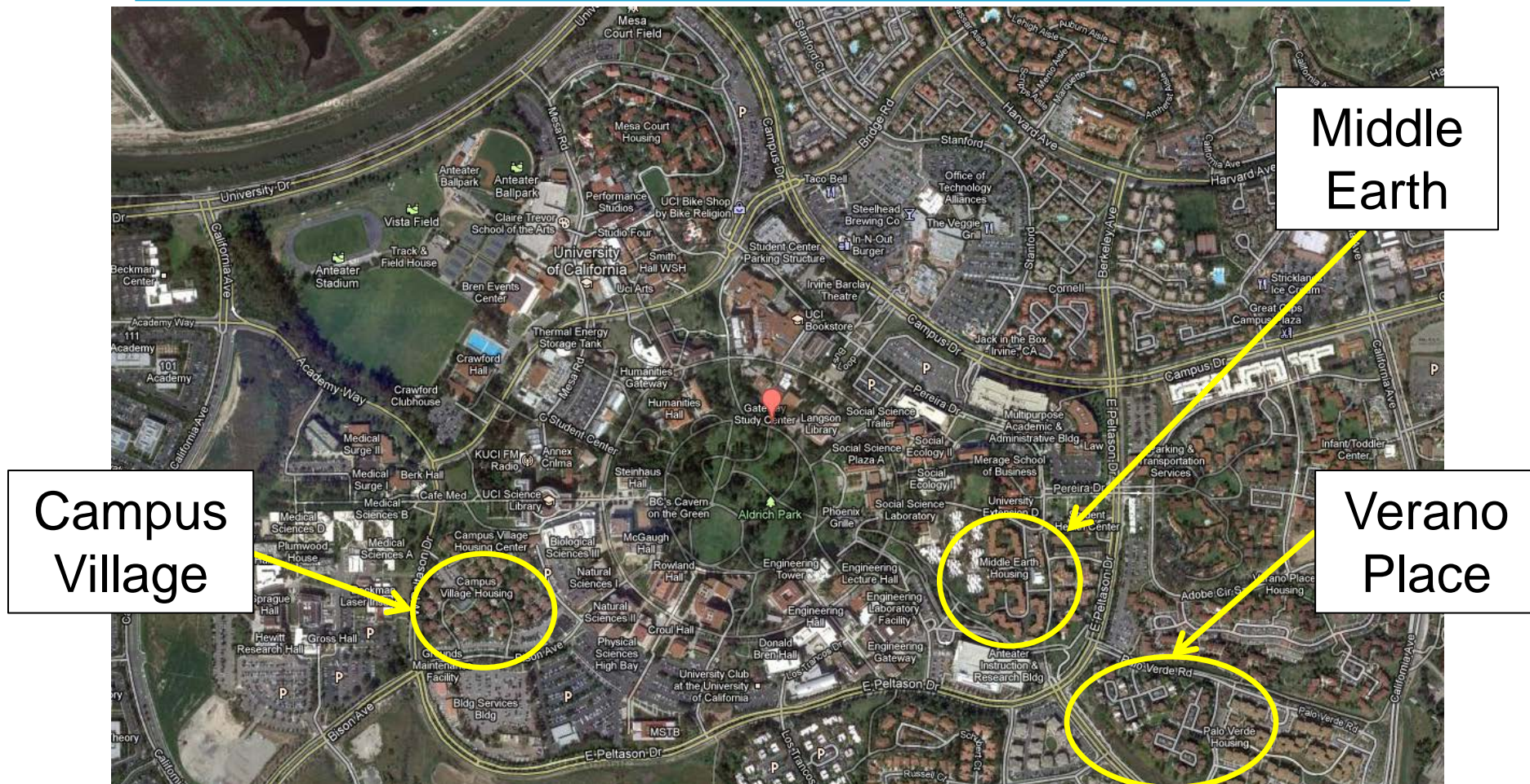


- Students: 27,189
- Faculty: 1,100
- Staff: 6,145
- Potable water use: 565,672 ccfs/year
- Recycled water use: 188,607 ccfs/year
- 220 Acres of landscaping 90% on recycled water
- 7 Cooling Towers at a Central Plant
- 30 Laboratories
- 6 Student Housing Communities
 - Home to over 6,000 students



UCI Student Housing Participants

Irvine Ranch Water District





-
- Reduce water consumption 15% below the 2007 baseline by 2014.
 - Increase the on-campus housing percentage to 50% by 2020.
 - Pilot test and demonstrate technologies that reduce energy or water consumption by 50% or more.



IRWD's Goals and Metrics

Irvine Ranch Water District

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- 20x2020 Legislation
 - 20% reduction in per capita water use by 2020.
 - Reduce reliance on imported water
 - Implement innovative and cost effective conservation programs



Campus Water Efficiency

Irvine Ranch Water District

- 2008 - 2012 UCI participates in the Statewide Energy Partnership Program
- 2009 Campus faucet aerator retrofit
- 2010 Campus Water use Efficiency survey
- 2010 Campus Central Computer Irrigation Controllers installed
- 2011 Campus plumbing fixture retrofit (Phase 1)
- **2011 Student Housing plumbing retrofit**
- 2012 Campus plumbing fixture retrofit (Phase 2)
- 2012 Student Housing “Water Battle”
- 2013 Campus (Phase 3) – Labs & Food Service



Stealth Pilot Study

- Measure water savings derived from plumbing fixture retrofit in three different student housing communities.
- Agreement August 2011
 - UCI, IRWD, Niagara Conservation
 - Niagara Conservation Sub-contracted for installs
- Installs began summer 2011

Project Scope & Implementation





Project Scope

Irvine Ranch Water District

| | Total Buildings | Total Fixtures * | Total Residents | Students Per Fixture | Year of Construction |
|--|-----------------|------------------|-----------------|----------------------|----------------------|
| Middle Earth | 4 | 88 | 332 | 4.23 | 2000 |
| Campus Village | 25 | 200 | 800 | 4.00 | 1980 |
| Verano Place | 12 | 300 | 600 | 2.00 | 1984 |
| *Fixture = toilet, showerhead, aerator combo | | | | | |



Study Group

Irvine Ranch Water District



- Meters were installed on two identical buildings from each community.
- One metered building from each community was not retrofit.
- Meters were monitored for at least 3 months.
- Control building retrofits were completed post monitoring period.



Project Appeal for UCI

Irvine Ranch Water District

-
- Direct retrofit without expense of new plumbing
 - Meets campus reduction goals
 - 10 year warranty on component parts
 - 1 year warranty on valves
 - WaterSense Certified, Certified by IAPMO R&T
 - LEED Credits: 2 Points



UCI Experience

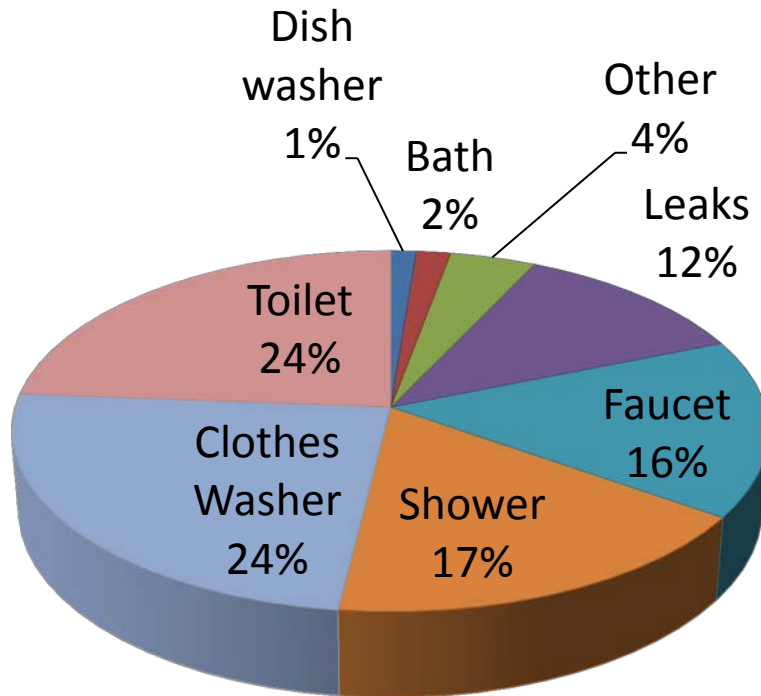
Irvine Ranch Water District

- Convincing stakeholders to participate
 - Overcoming preconceived notions of low-flow toilets
 - Pilot testing toilets
 - Finding the right fit – identifying housing communities to participate
- Executing the agreement
- Customer feedback
 - Positive experience overall
 - Limited negative feedback directed towards the shower heads, not toilets
 - Few maintenance issues

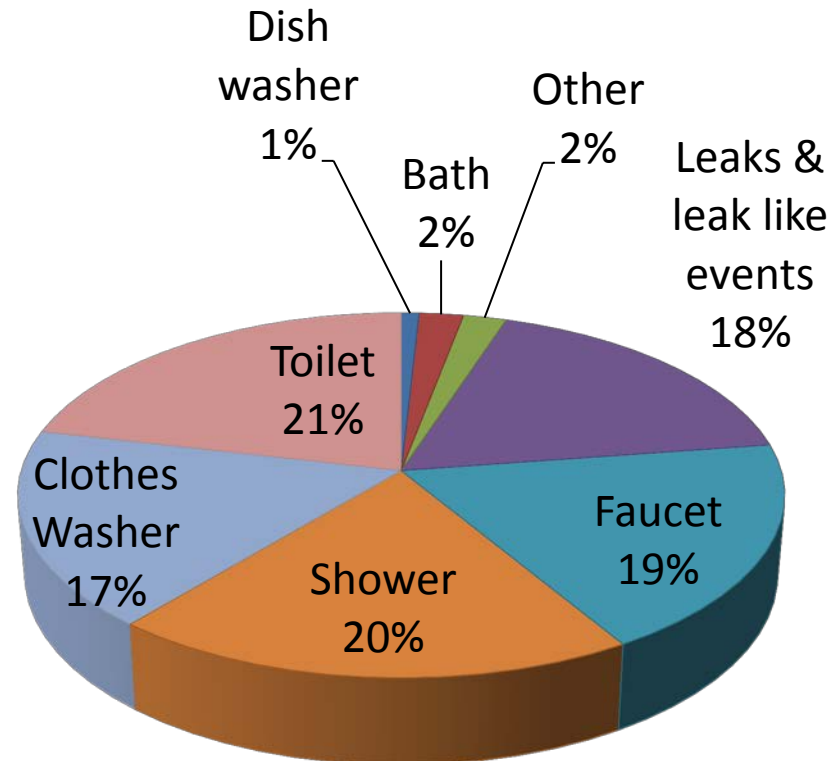


Indoor Residential Water Use

Irvine Ranch Water District



Cal Residential End Use of Water Study (1999)

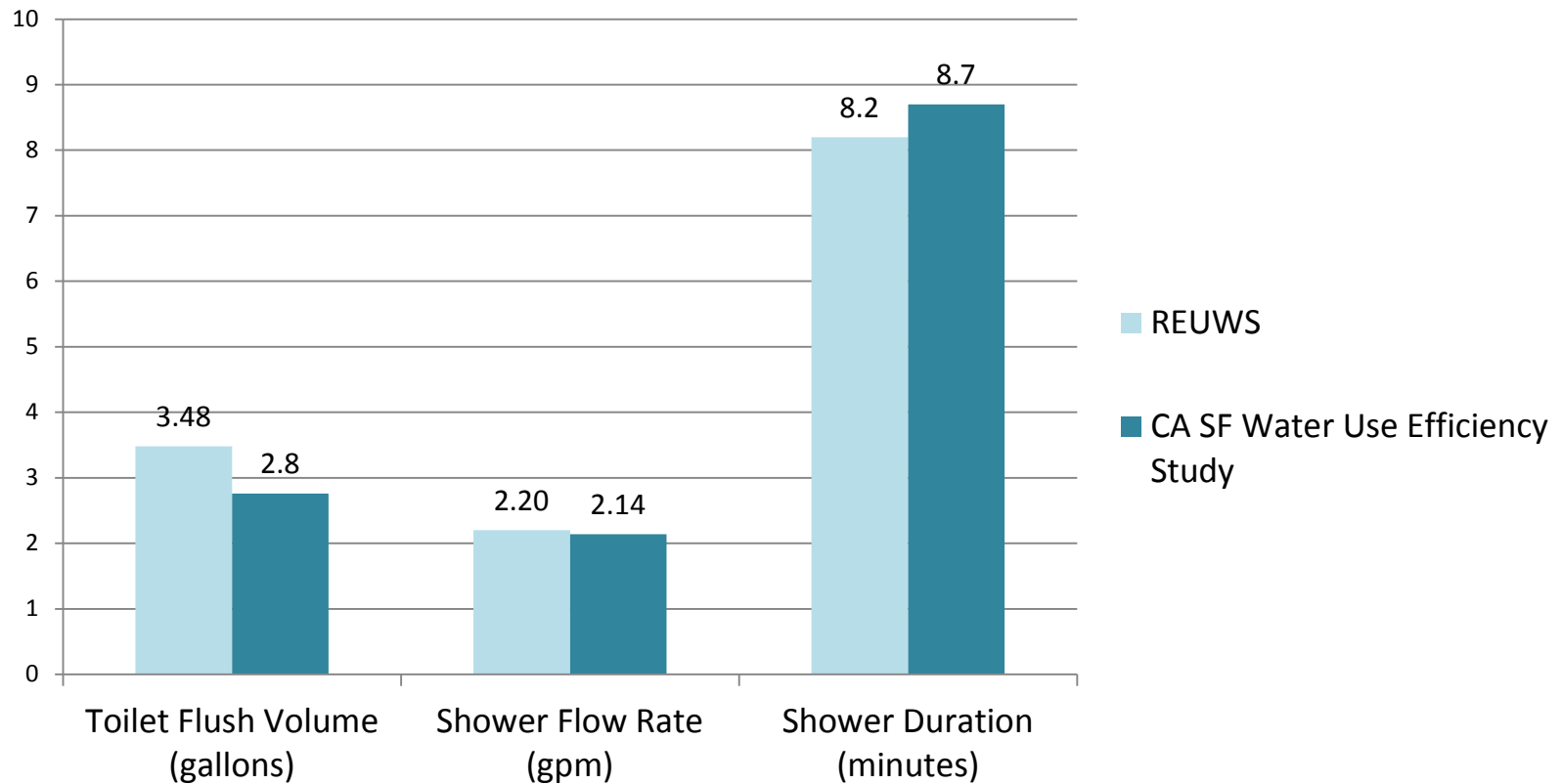


CA Single-Family Water Use Efficiency Study (2011)



Fixture Performance per Home

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High Performance Plumbing Fixtures

Irvine Ranch Water District





The Stealth Toilet

Irvine Ranch Water District



Ultra High Efficiency Toilet

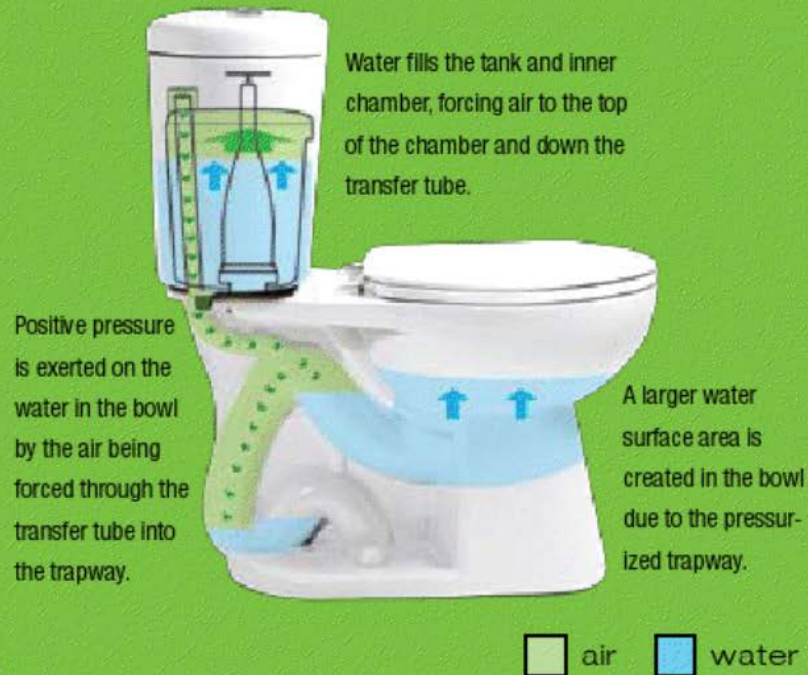
- 0.8 Gallons Per Flush (GPF)
- Map Score > 600
- Direct replacement of existing fixture



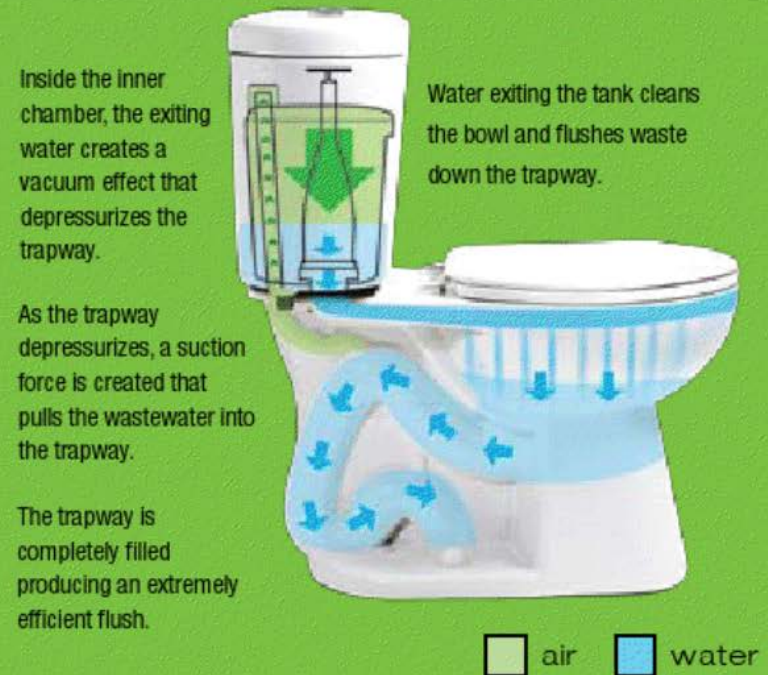
How it Works

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Filling



Flushing





Plumbing Fixtures

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Tamperproof high-efficiency
aerators (0.5 gpm)



Earth Showerhead
(1.5 gpm)



Before



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Implementation

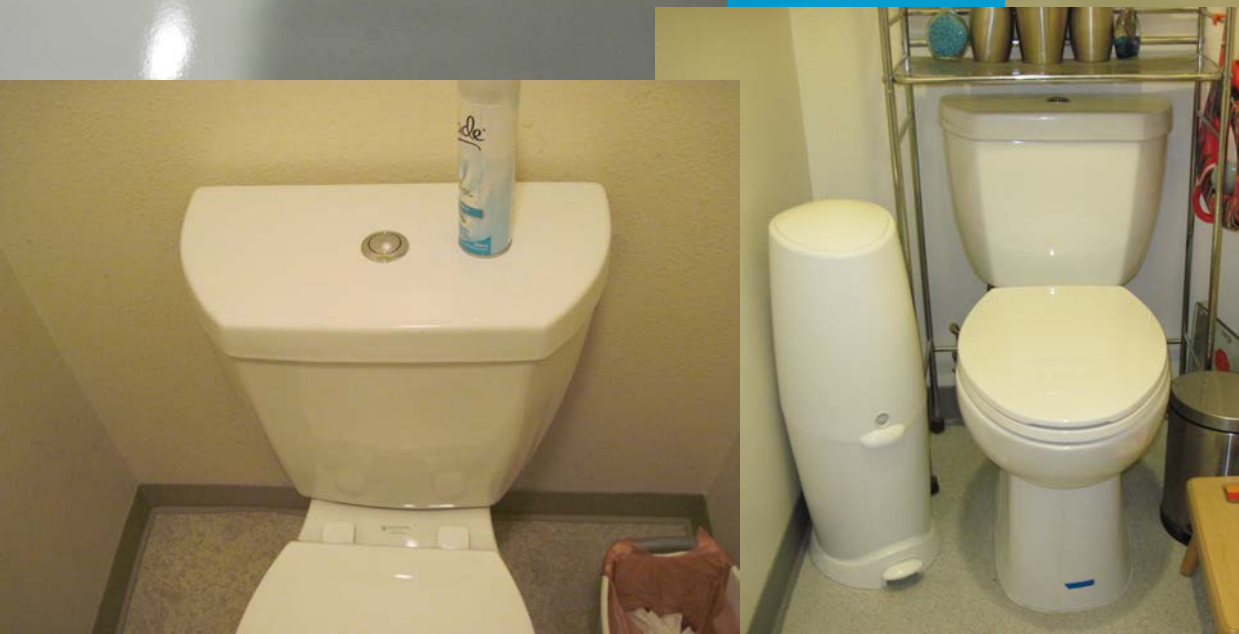


Irvine Ranch Water District



After

 **NIAGARA**
CONSERVATIONS
0.8 Gpf/3.0 Lpf



Compatible with Accessories



Water Savings

Irvine Ranch Water District





Water Savings

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| Housing Complex | Housing Type | Existing Toilet Flush Volume | Total Packages Installed | Students per Package | Gallons per Day Savings per Package | Gallons per Day Savings per Student | Annual Project Water Savings AF (Adjusted for Occupancy) | Total Lifetime Savings AF (10 yrs) | Percent Reduction in Metered Water Use |
|-----------------|--------------|------------------------------|--------------------------|----------------------|-------------------------------------|-------------------------------------|--|------------------------------------|--|
| Middle Earth | Dorm. | 1.6 | 88 | 4.32 | 59 | 13.65 | 4.23 | 42.35 | 50% |
| Verano Place | Apart. | 3.5 | 300 | 2.00 | 74 | 36.80 | 18.03 | 180.25 | 39% |
| Campus Village | Apart. | 3.5 | 200 | 4.00 | 41 | 10.36 | 6.76 | 67.63 | 24% |

Benefits





Student Housing Benefits

Irvine Ranch Water District

No cost install for pilot study

Project saves almost 9.5 Million Gallons per Year

Reduced resident toilet maintenance calls

Cost savings on water & wastewater billed by UCI facilities \$43,000 annually



Future Projects:

- Laboratories have potential with retrofit of sterilizers with Water Mizers.
- Food services have inefficient food steamers.
- Continue plumbing fixture retrofits throughout campus and student housing.
- Turf replacement with California Friendly plants
- Sprinkler nozzle retrofits
- Weather Based Irrigation Controllers



Contact Information

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