

GRAYWATER RESIDENTIAL LAUNDRY TO LANDSCAPE SEMINAR



CUPERTINO GREEN

March 8th, 2016

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Utility & Efficiency Coordinator

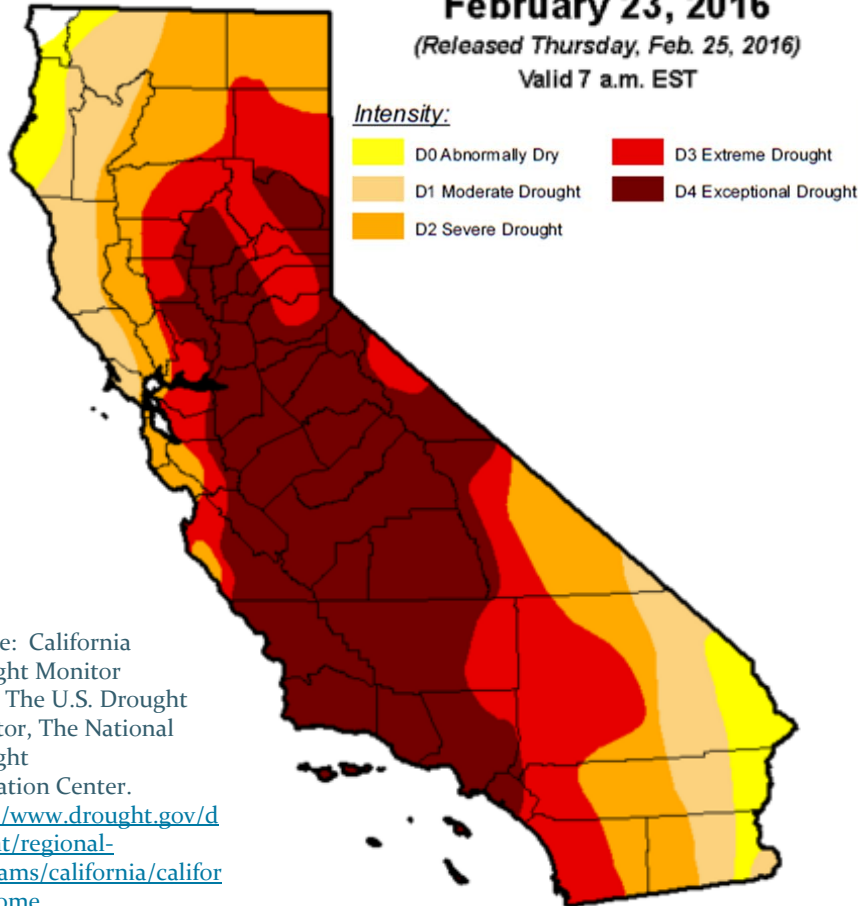
City of Cupertino

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DROUGHT UPDATE

U.S. Drought Monitor California

February 23, 2016
(Released Thursday, Feb. 25, 2016)
Valid 7 a.m. EST



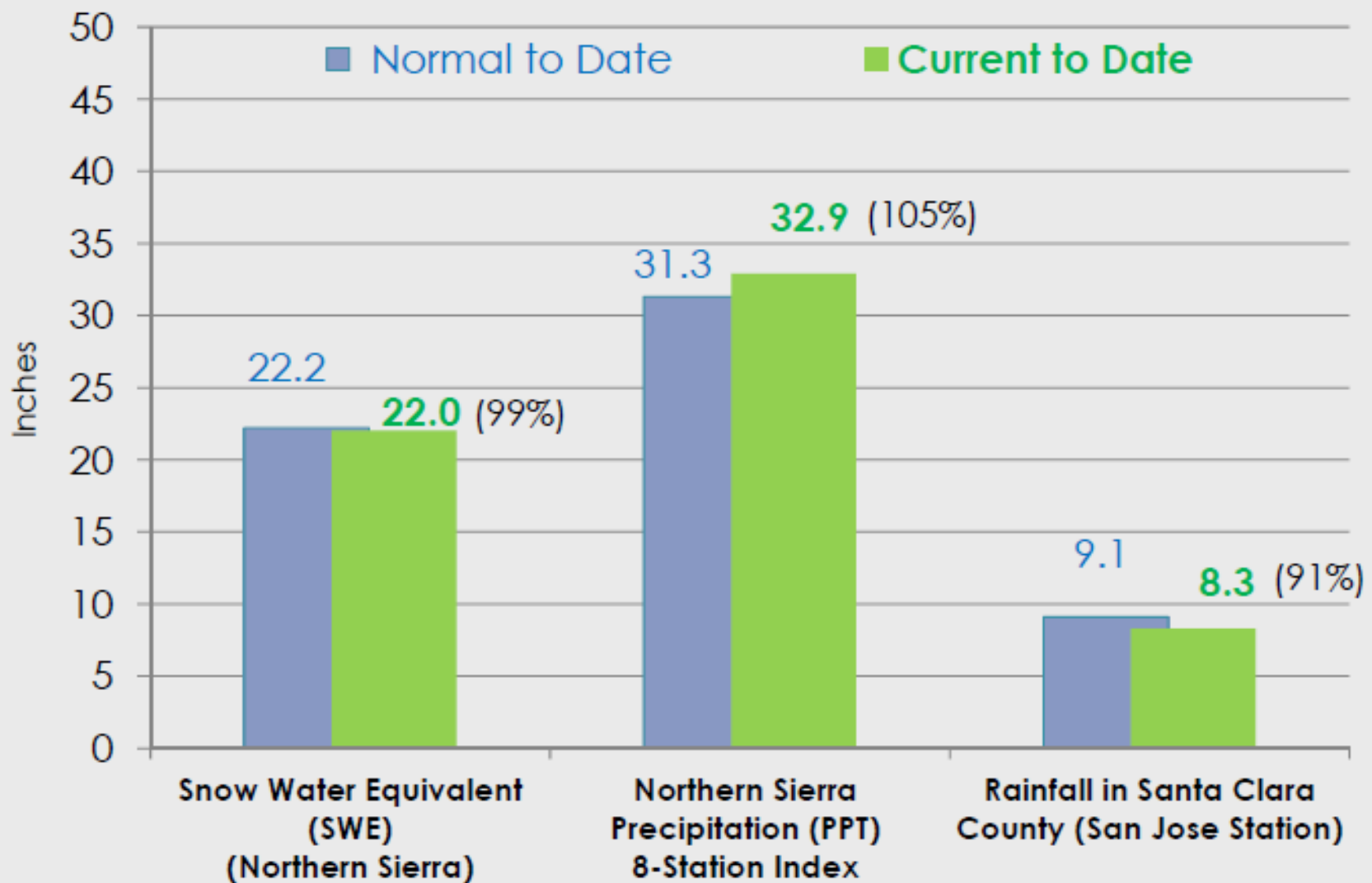
Source: California Drought Monitor Map. The U.S. Drought Monitor, The National Drought Mitigation Center. <http://www.drought.gov/drought/regional-programs/california/california-home>

- *Much of Santa Clara County continues to experience “Extreme” drought*
- *Call for 30% reduction continues through June*

AGENDA

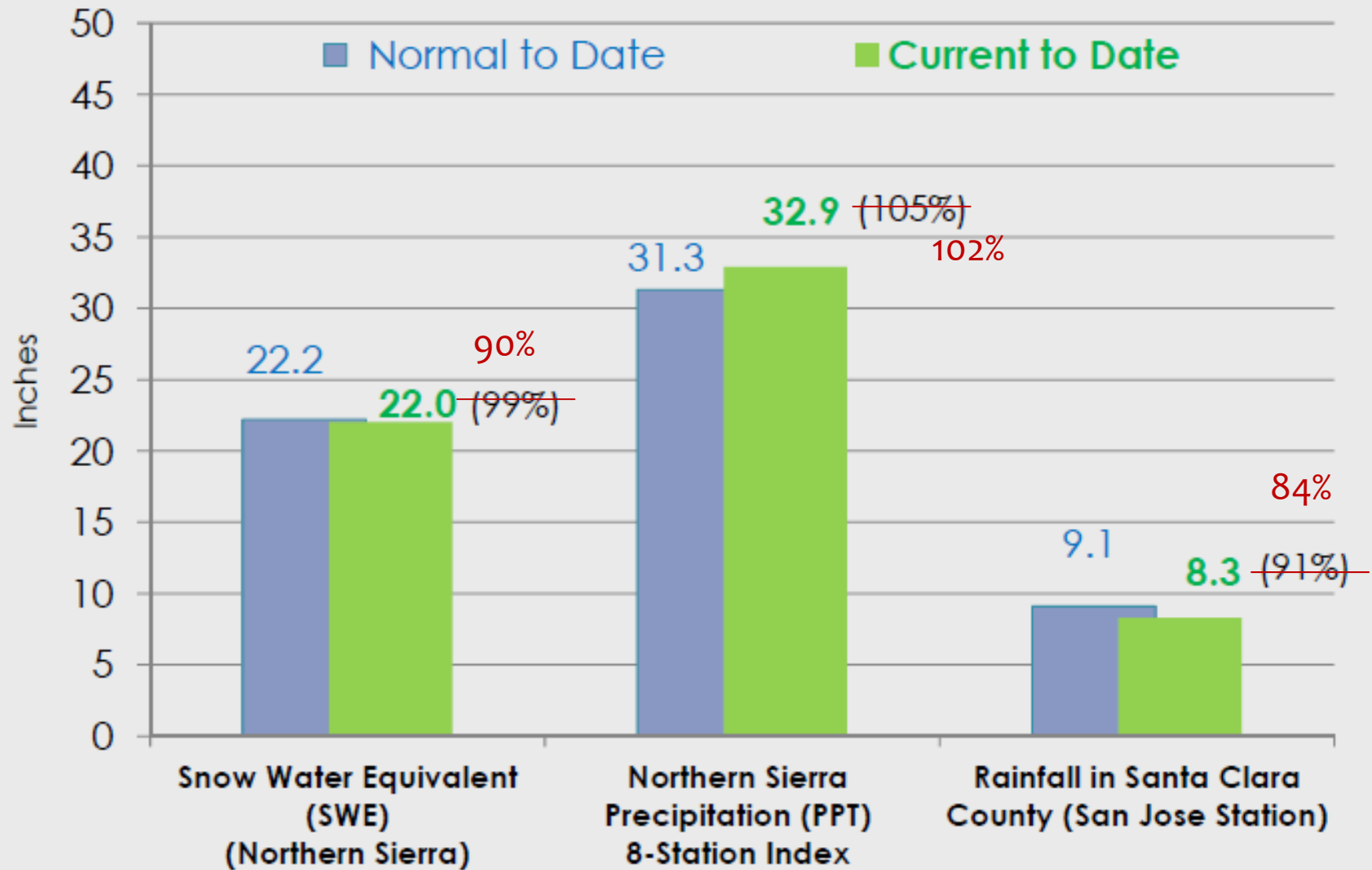
- *Drought Update*
- *Graywater Introduction*
- *Laundry to Landscape Introduction*
- *Santa Clara Valley Water District \$200 L2L Rebate*
- *Graywater Code and Regulations*
- *Assessing Your Home*
- *Indoor Design*
 - *Demonstration*
- *Outdoor Design*
- *Maintenance of Your System*
- *Resources*

Precipitation as of Feb 16, 2016

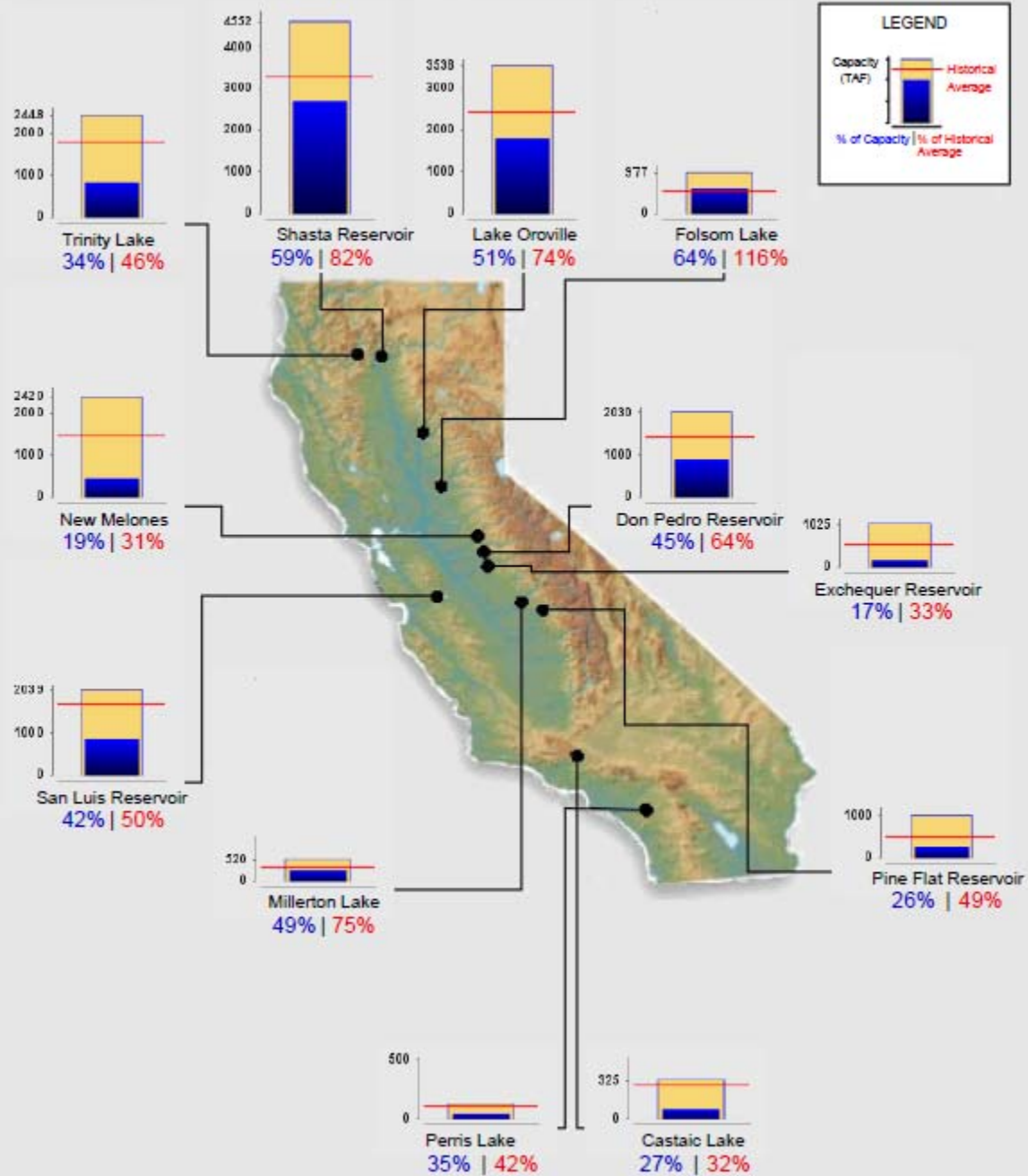


Precipitation as of Feb ~~16~~, 2016

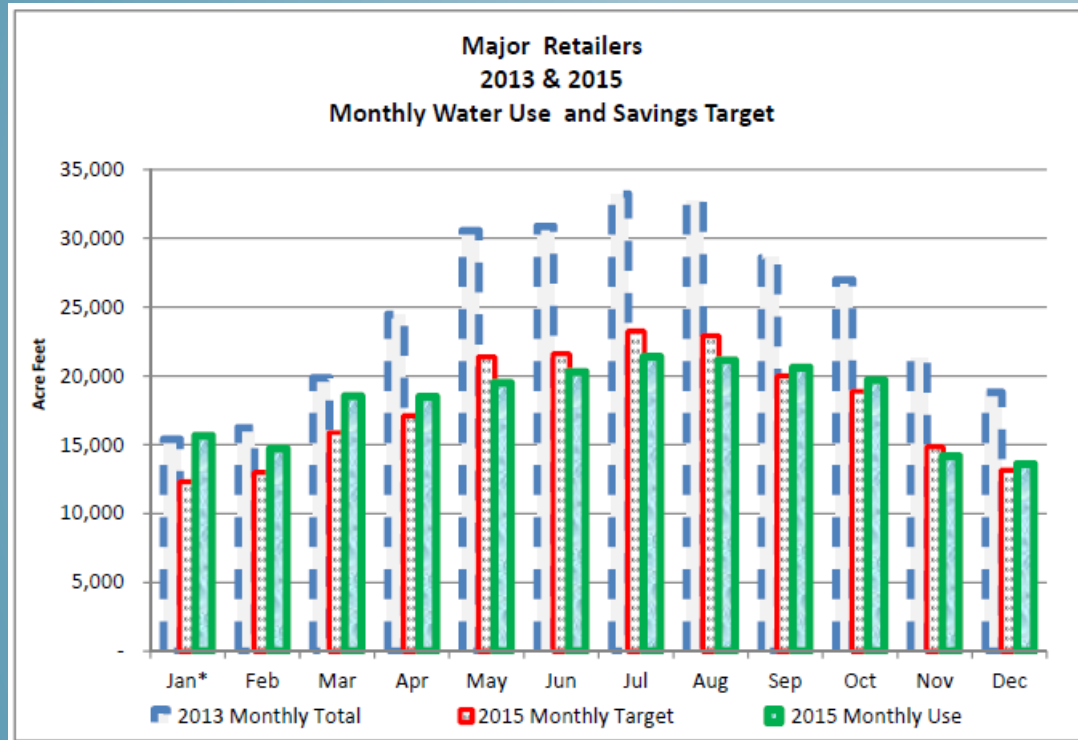
28th



CURRENT RESERVOIR CONDITIONS



DROUGHT RESPONSE



<http://www.valleywater.org/drought/#updates>

- *27% countywide savings in 2015*
- *29% City of Cupertino Municipal savings*
- *Exceeded state mandated goal of 25% and just below the District goal of 30%*

WHAT IS GRAYWATER?

- **Graywater** (or greywater) is relatively clean wastewater from clothes washers, bathtubs, showers, and bathroom sinks
- **Blackwater** (or sewage) is wastewater from toilets, diaper washing, kitchen sinks (in CA), and any other wastewater that is not considered fit for reuse

The main difference between the two is the **organic loading**

BENEFITS OF GRAYWATER

- *Offset potable water use*
 - *Simple systems can recycle thousands of gallons/yr*
- *Valuable nutrients for plants*
- *Reduces amount of sewage (water treatment)*
- *Automatic and reliable watering*
- *Provides a reconnection and reminder of the natural water cycle*

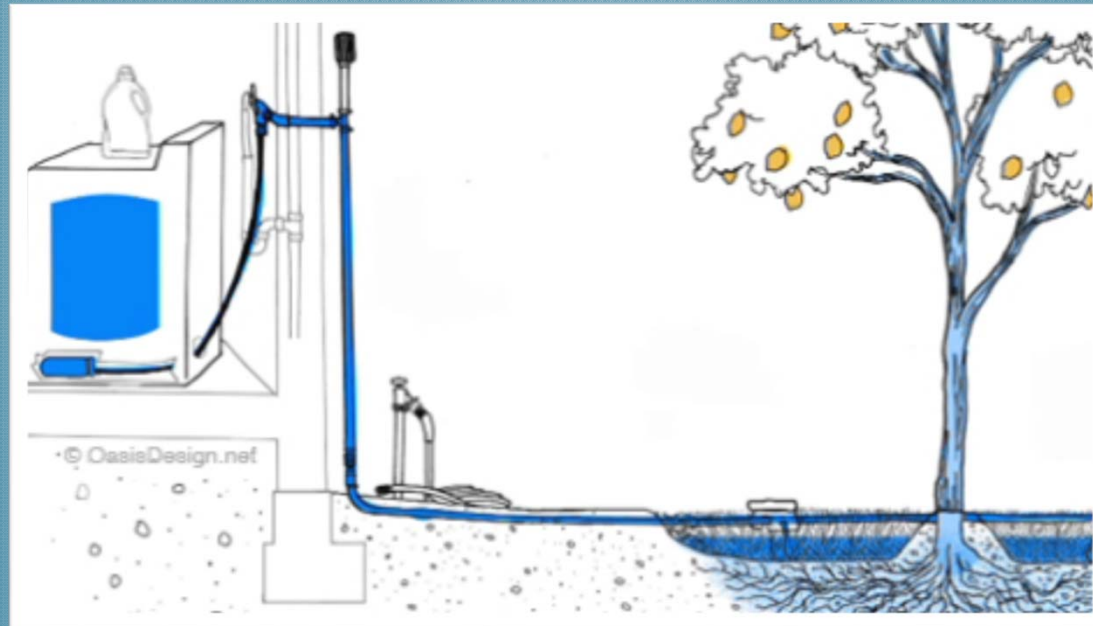


Graywater irrigated landscape.

graywateraction.org

WHAT IS L2L?

- *“Laundry to Landscape” (or L2L) was introduced in 2008 by Art Ludwig*
 - *Reuses washing machine water for nearby landscape*



“Create An Oasis with Graywater” by Art Ludwig

BENEFITS OF L2L



Example of indoor portion of L2L system.

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- *Low cost*
- *Simple*
- *Low maintenance*
- *Flexible design*
- *Easy to adjust after install*
- *Permit not required (provided compliance with the plumbing code)*
- *\$200 rebate available from the Santa Clara Valley Water District*

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SANTA CLARA VALLEY WATER DISTRICT
\$200 L2L REBATE



- *\$200 flat rebate per single family home*
- *Steps:*
 - *Pre-Inspection Survey & Photos*
 - *Email jburks@valleywater.org*
 - *or call (408) 630-2684*
 - *Application, water bill, & diagram*
 - *Receive a notice to proceed*
 - *Install your system*
 - *Post-Inspection*
 - *Receive rebate \$\$*
- *More info at valleywater.org*

GRAYWATER REGULATIONS

- *Ch 16 of the CA Plumbing Code*
- *No permit required for L2L*
- *12 conditions for permit exemption*
- *Code going through revision*

CHAPTER 16

I ALTERNATE WATER SOURCES FOR NONPOTABLE APPLICATIONS

Intent

The provisions of this chapter are intended to:

- 1. Conserve water by facilitating greater reuse of laundry, shower, lavatory and similar sources of discharge for irrigation and/or indoor use.*
- 2. Reduce the number of non-compliant gray water systems by making legal compliance easily achievable.*
- 3. Provide guidance for avoiding potentially unhealthful conditions.*
- 4. Provide an alternative way to relieve stress on a private sewage disposal system by diverting the graywater.*

1601.4 Component Identification. System components shall be properly identified as to the manufacturer.

1601.5 Maintenance and Inspection. Alternate water source systems and components shall be inspected and maintained in accordance with *the manufacturer's recommendations and/or as required by the Enforcing Agency. [BSC] Where no manufacturers recommendations exist, additional recommendations are listed in Table 1601.5.*

1601.5.1 Maintenance Responsibility. The required maintenance and inspection of alternate water source systems shall be the responsibility of the property owner, unless otherwise required by the Authority Having Jurisdiction.

12 CONDITIONS FOR PERMIT EXEMPTION

- *Due Diligence*
 - *Notify your enforcing agency if required (usually building/permitting dept.)*
 - *Must follow the plumbing code and other laws or ordinance where applicable*
- *Clear Instructions*
 - *Diverter valve clearly labeled & easily accessible*
 - *Must have an operation and maintenance manual for the life of the system*

12 CONDITIONS FOR PERMIT EXEMPTION

- *Health and Safety*
 - *No potable water connection or pump*; does not affect other building, plumbing, electrical, or mechanical components
 - Graywater shall be *contained on site*
 - ...within irrigation or disposal field
 - *No ponding or runoff*
 - Designed to *minimize human contact*
 - Must have at least 2" of mulch, rock, or soil, or have a solid shield covering release point
 - Diaper washing or similarly *infected water* shall be sent to sewer
 - *Must not contain hazardous materials*

OTHER RULES AND GUIDELINES

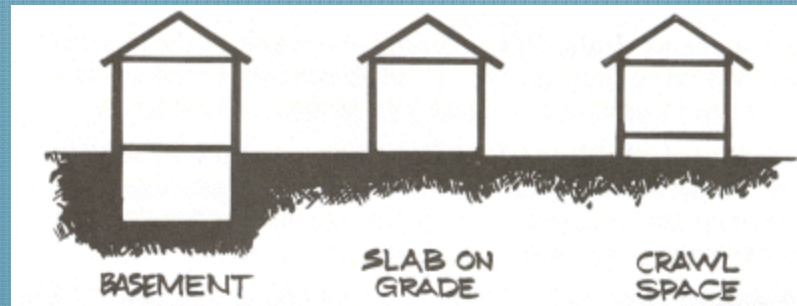
- *No overhead (spray) irrigation*
- *Cannot be used to irrigate root crops*
- *The landscape area where graywater is used must be located:*
 - *18" away from any property line*
 - *2' away from any building*
 - *100 ft from any wells, waterways, or other water sources*
 - *5 ft from any septic tank*
 - *In an area where seasonal high groundwater is at least 5 ft below the surface (can be verified by SCVWD)*

STEPS

- *Assess Your Home*
- *Design Your System*
 - *Indoors*
 - *Outdoors*
- *Maintain Your System*

ASSESSING YOUR HOME: INDOORS

- *Where is your washing machine located?*
 - *Near an exterior wall*
 - *Only interior walls*
 - *Above a crawl space or basement*
 - *Above a slab foundation*



ASSESSING YOUR HOME: INDOORS

- *What type of washing machine do you have?*



Top-Loader with Agitator
<http://home.howstuffworks.com/>



Front-Loader
<http://home.howstuffworks.com/>



ASSESSING YOUR HOME: INDOORS

- *What type of detergent should I use?*
 - *Avoid detergents with salts and boron*
 - *Divert water to sewer when running loads with chlorine bleach or other chemicals harmful to plants*
 - *Helpful resource:*
<http://www.harvestingrainwater.com/greywater-harvesting/greywater-compatible-soaps-and-detergents/>
- *Softened water?*
 - *If you have a sodium based water softener, consider switching to a potassium based system or bypass your washing machine*

ASSESSING YOUR HOME: OUTDOORS

- *Where is the landscape?*
 - < 50 ft from the washing machine?*
 - Same or decreasing elevation?*
 - >100 ft away from creeks, wells, and waterways?*
 - >5 ft to seasonal high groundwater levels?*
 - >2 ft away from buildings?*
 - >1.5 ft away from property lines?*
 - >5 ft away from any septic tanks?*



ASSESSING YOUR HOME: OUTDOORS

- *Soil type?*

$$\frac{\text{MAX Gal/Day}}{\text{Absorption Capacity}} =$$

*Square feet
of mulch basin
needed*

**TABLE 1602.10
DESIGN OF SIX TYPICAL SOILS**

TYPE OF SOIL	MINIMUM SQUARE FEET OF IRRIGATION/LEACHING AREA PER 100 GALLONS OF ESTIMATED GRAY WATER DISCHARGE PER DAY	MAXIMUM ABSORPTION CAPACITY IN GALLONS PER SQUARE FOOT OF IRRIGATION/LEACHING AREA FOR A 24-HOUR PERIOD
Coarse sand or gravel	20	5.0
Fine sand	25	4.0
Sandy loam	40	2.5
Sandy clay	60	1.7
Clay with considerable sand or gravel	90	1.1
Clay with small amounts of sand or gravel	120	0.8

For SI units: 1 square foot = 0.0929 m², 1 gallon per day = 0.000043 L/s

ASSESSING YOUR HOME: OUTDOORS

- *Which plants?*
 - *L2L not compatible with lawns*



ASSESSING YOUR HOME: OUTDOORS

- *Which plants?*
 - *Ideal for fruit trees and water intensive shrubs*



ASSESSING YOUR HOME: OUTDOORS

- *Which plants?*
 - *Less ideal for several small plants or drought tolerant plants (can be accommodated with adjustments)*

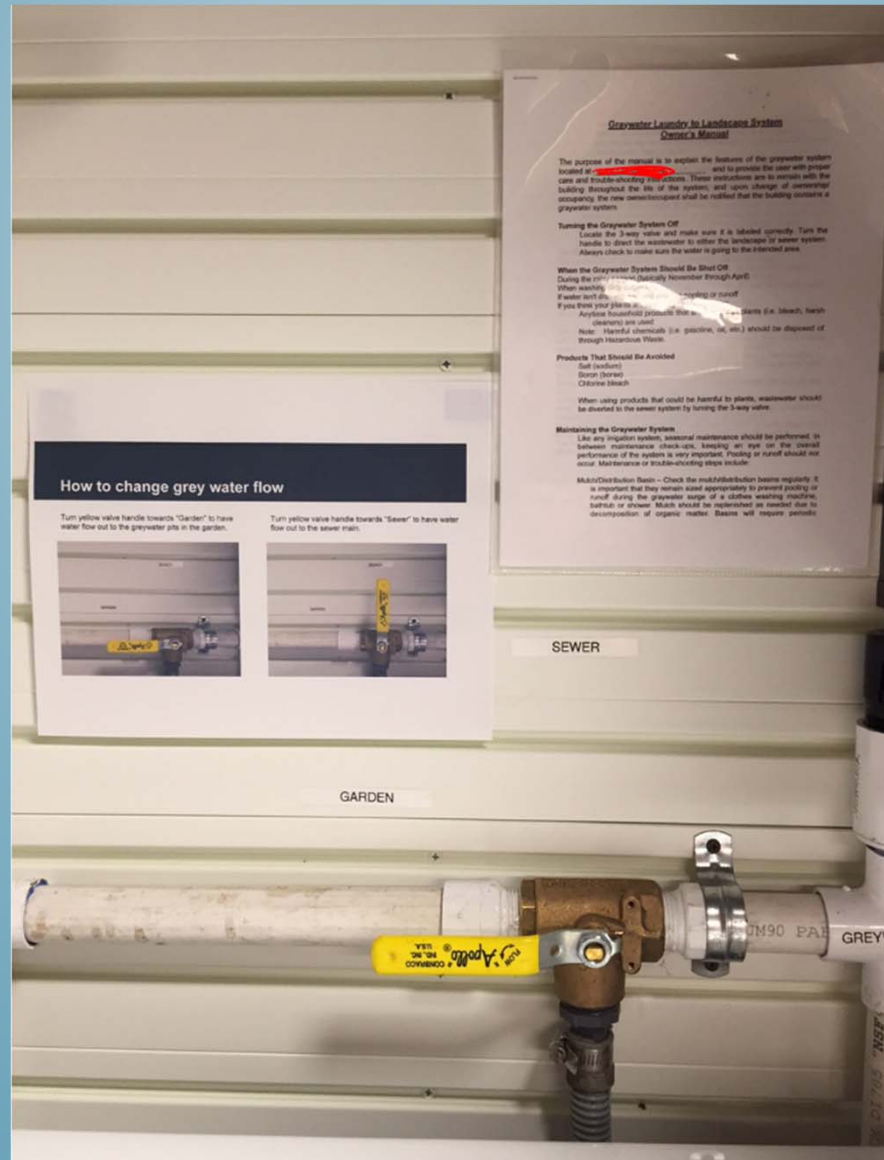


INDOOR DESIGN: 3-WAY DIVERTER VALVE



3-Way Diverter Valve
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INDOOR DESIGN: LABEL & OPERATION AND MAINTENANCE MANUAL



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INDOOR DESIGN: SEWER DRAIN PIPE



Example of indoor portion of L2L system.

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INDOOR DESIGN: AUTO VENT (AAV, IN-LINE VENT) & EXITING THE HOME



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OUTDOOR DESIGN: MULCH BASINS

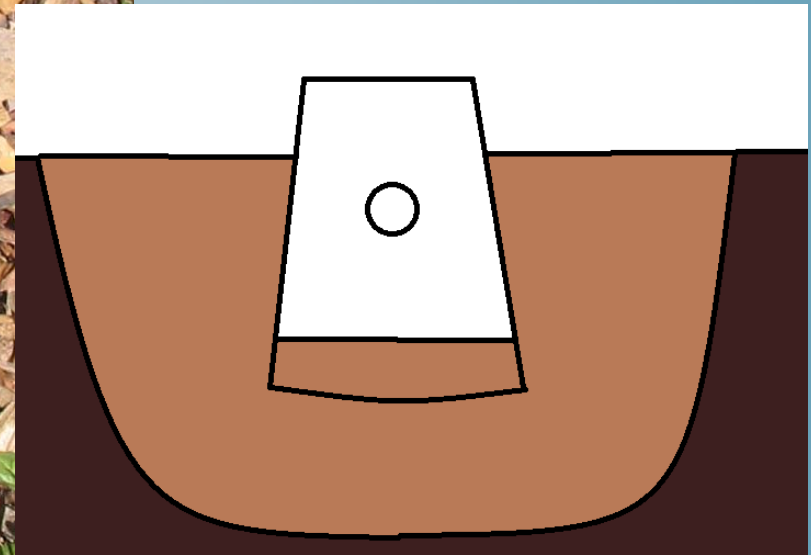


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OUTDOOR DESIGN: MULCH BASINS



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OUTDOOR DESIGN: MULCH SHIELDS

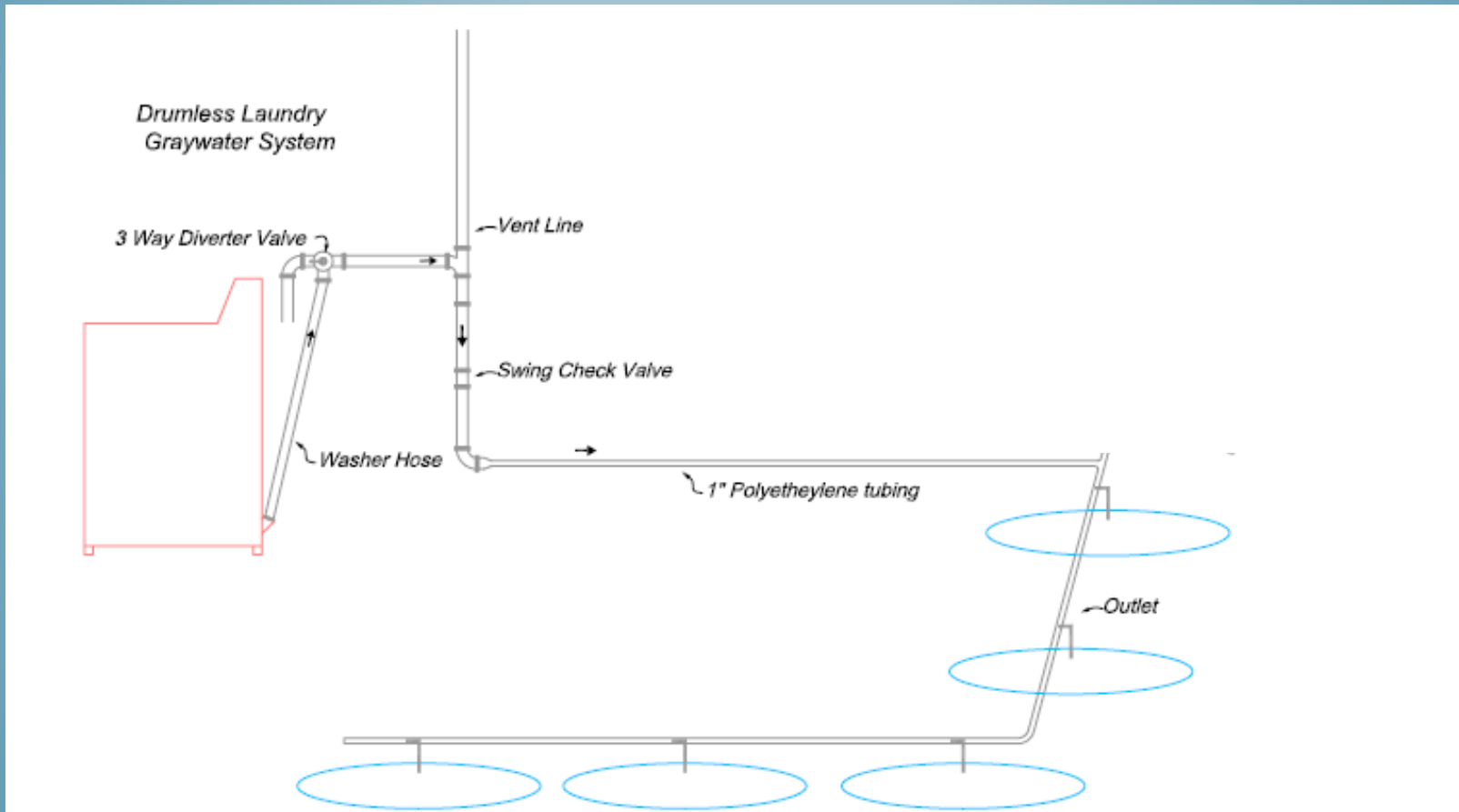


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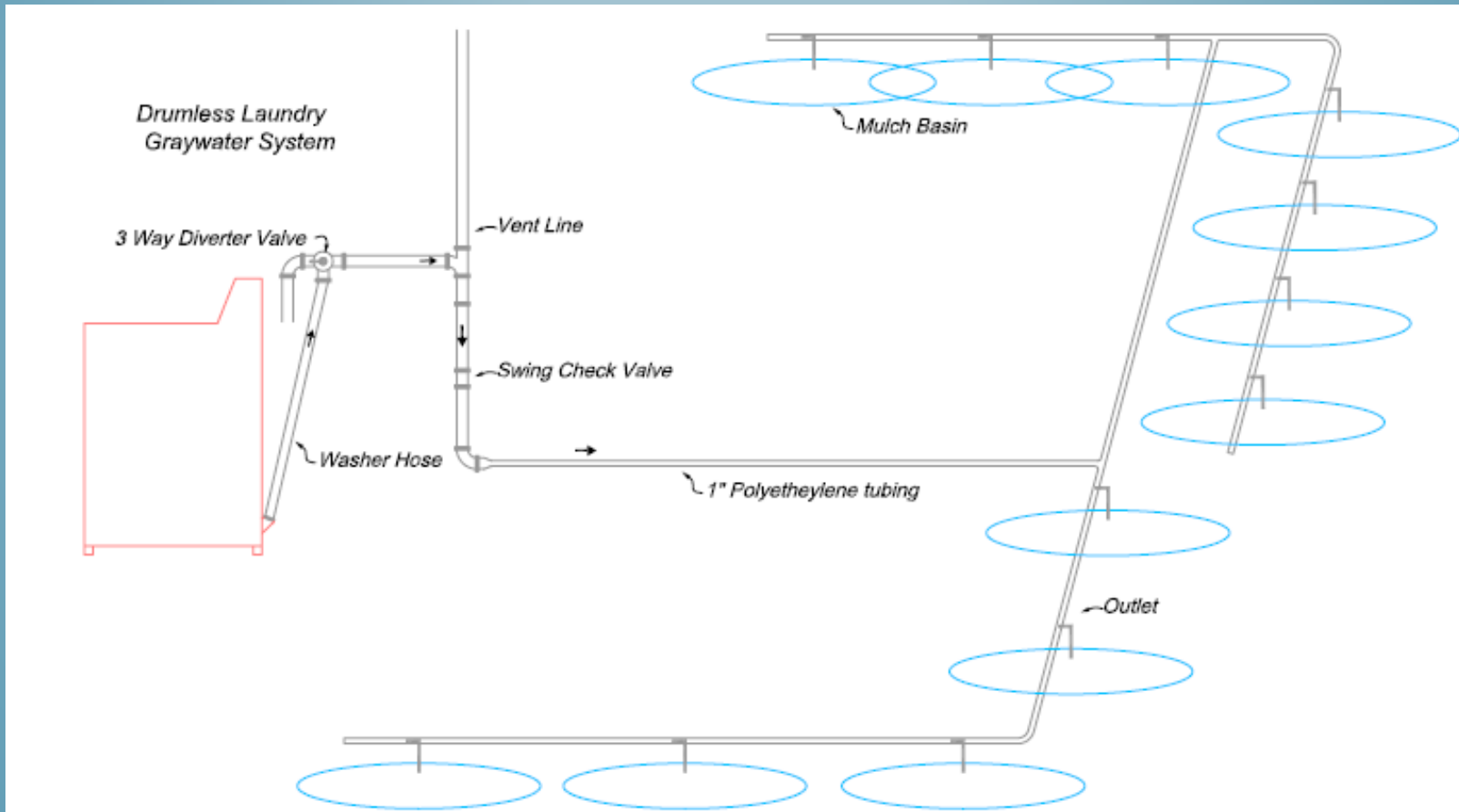


OUTDOOR DESIGN: MULCH BASINS



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OUTDOOR DESIGN: ZONED SYSTEMS



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OUTDOOR DESIGN: ZONED SYSTEMS



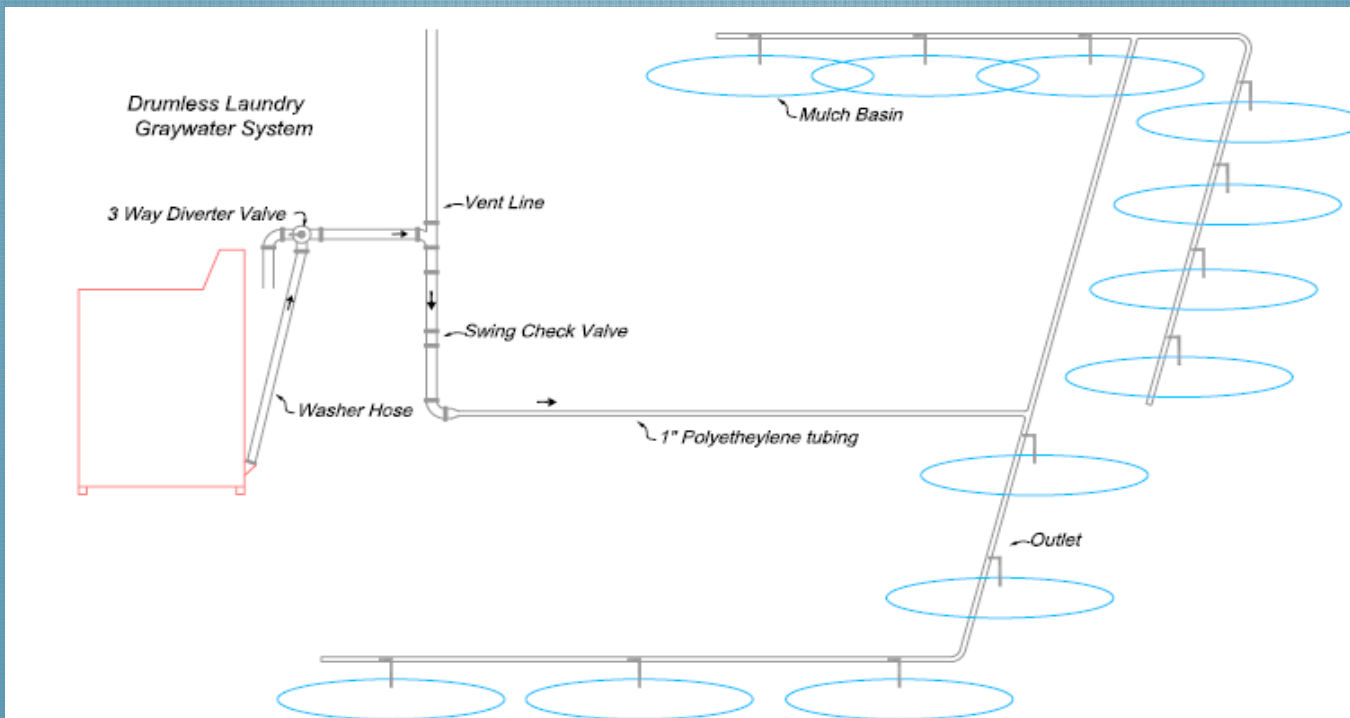
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OUTDOOR DESIGN: REDUCE RESISTANCE POINTS

- *Gentle turns instead of 90 degree angles*
- *Open 1" end*
- *Minimize # of valves used*



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MAINTENANCE OF YOUR SYSTEM

- *Check your system often during first few months of installation*
- *Once or twice a year:*
 - *Replace mulch*
 - *Check mulch shields*
 - *Check any valves or piping*
 - *Check system for clogging*
 - *Test your system to ensure everything is working properly*

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CUPERTINO GREEN

LEARN MORE

- *City of Cupertino*
 - www.cupertino.org/savewater
- *Santa Clara Valley Water District*
 - www.valleywater.org
- *Greywater Action*
 - www.greywateraction.org
- *Central Coast Greywater Alliance*
 - www.centralcoastgreywater.org
- *Soap and Detergent Info*
 - <http://www.harvestingrainwater.com/greywater-harvesting/greywater-compatible-soaps-and-detergents/>

THANK YOU FOR COMING!



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