

# Welcome to the 2018 Landscape Summit



Santa Clara Valley  
Water District



# AGENDA

- Welcome from District Board Chair Richard Santos
- State of the Valley's Water – Garth Hall
- Keynote Address – Kevin Breen
- Break
- Case Study Presentations
- Small Group Exercise
- Lunch and Self-Guided Landscape Tour

# State of the Valley's Water

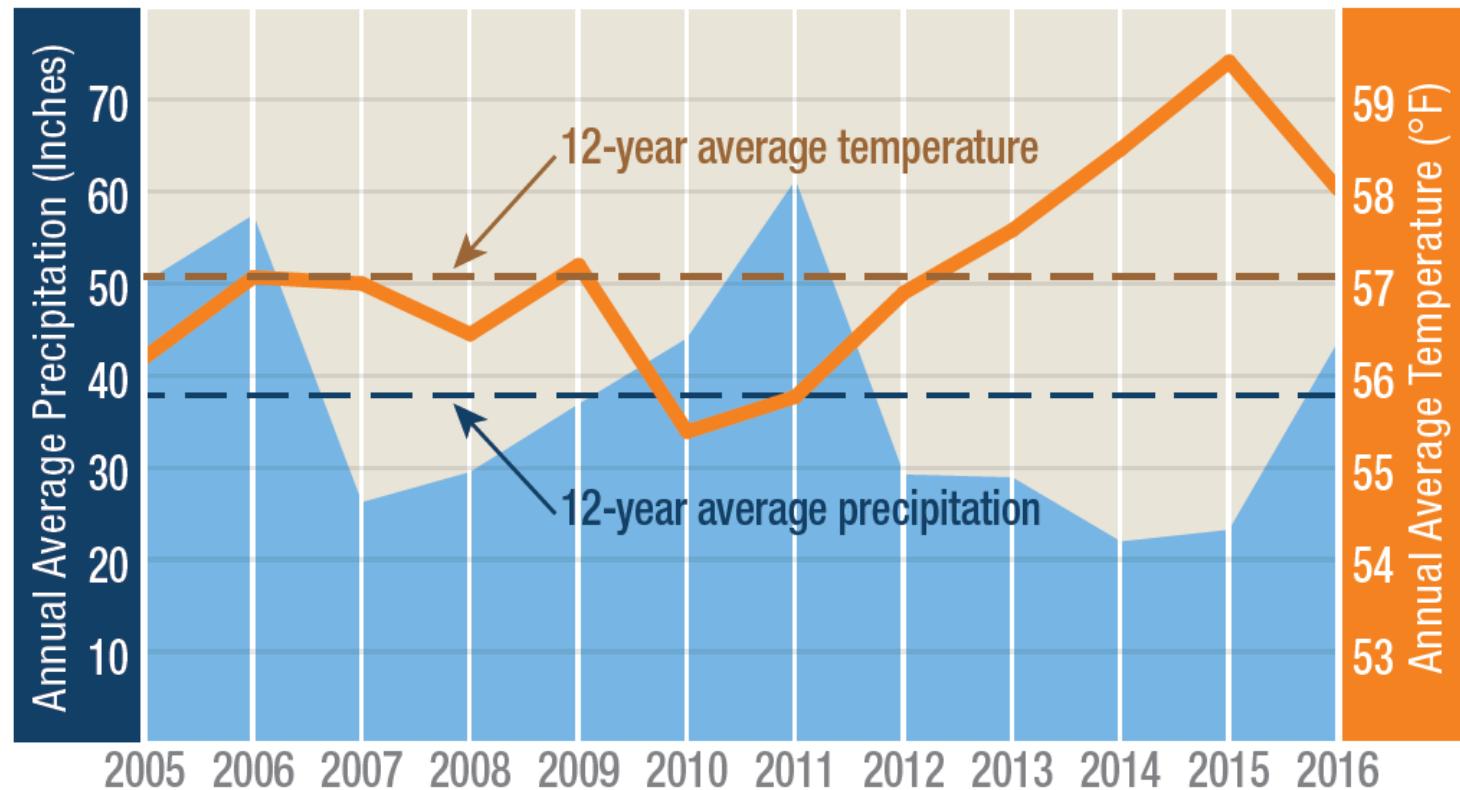
**Garth Hall**

Deputy Operating Officer

Water Supply Division

Santa Clara Valley Water District

# California's Historic 5 Year Drought

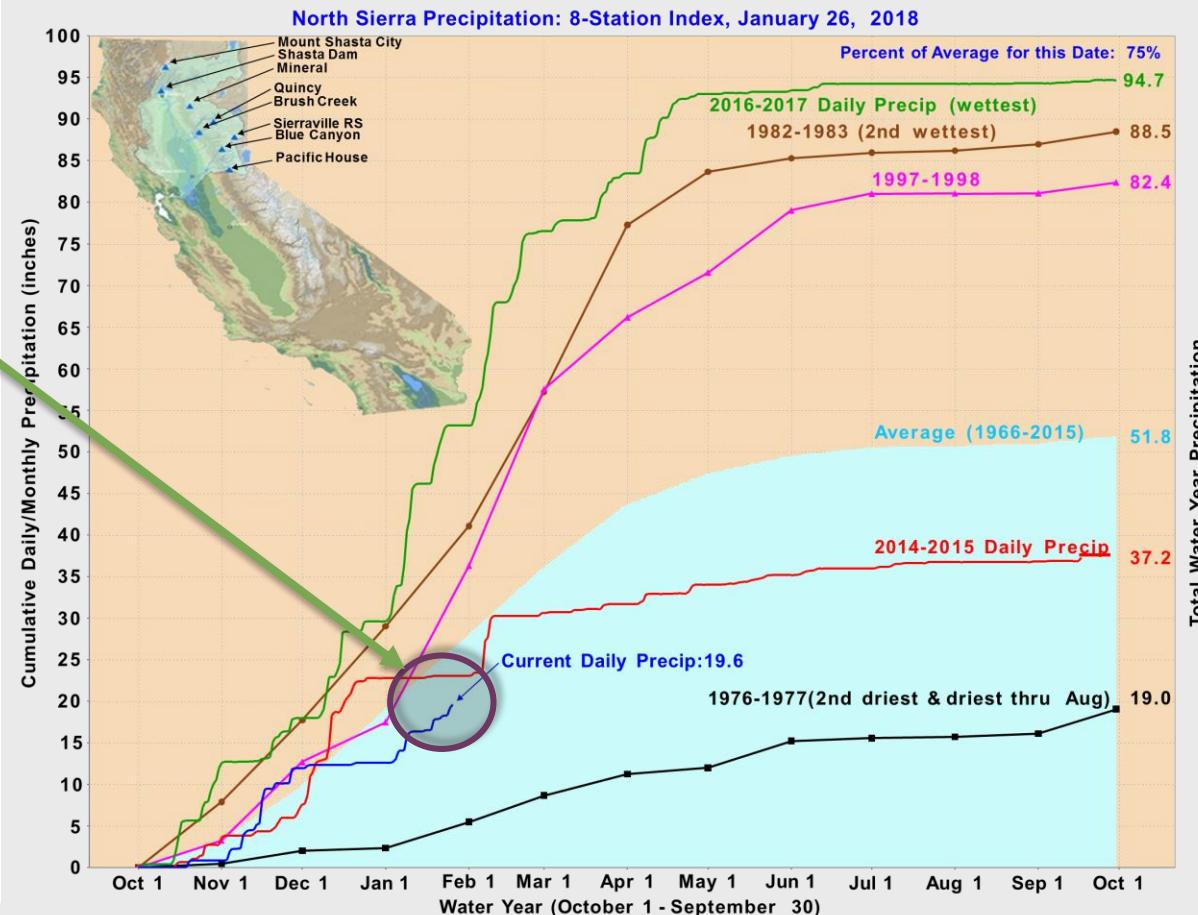
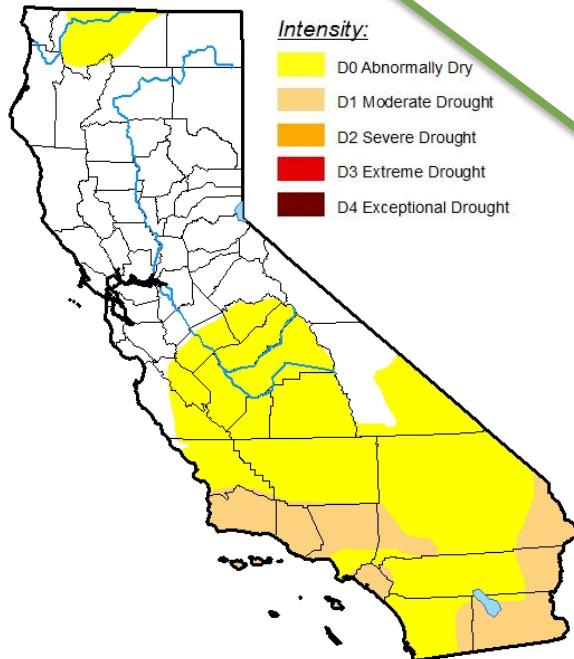


California has experienced near-record temperatures in recent years.  
Source: California Department of Water Resources

# Current Statewide Conditions

Due to a dry December across much of the state, snow and hydrologic conditions are declining. The US Drought Monitor has expanded drought conditions as a result of low snow and precipitation values, as well as high evaporative demand due to above-normal temperatures

## U.S. Drought Monitor California January 23, 2018



Also, the January 3, 2018, northern Sierra Nevada manual survey at Phillips Station snowpack's water content was 3 percent of average. The current northern California snowpack is estimated to be at 29% of average. The next manual survey is February 1<sup>st</sup>.

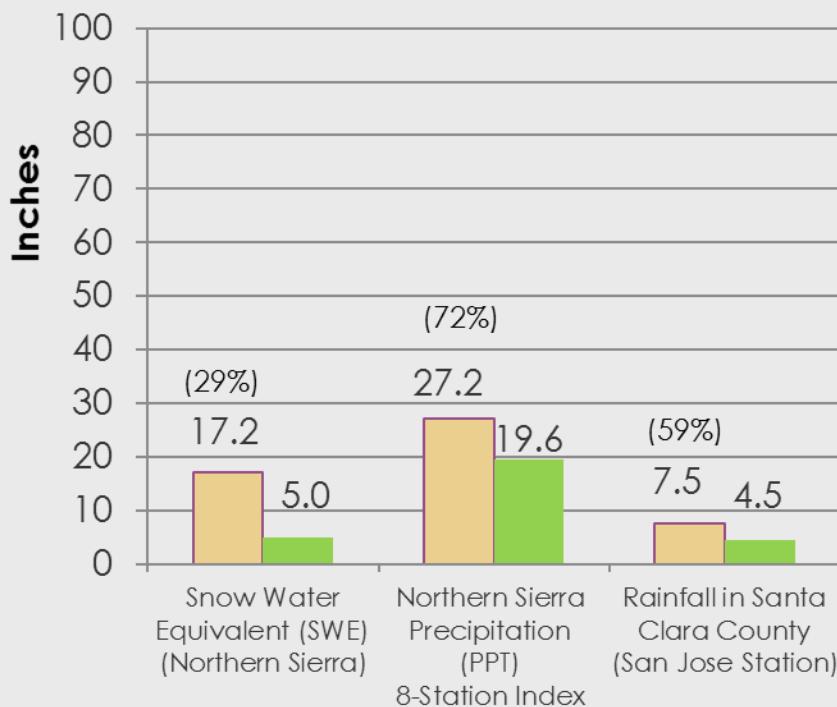
# 2017/18 Hydrologic and Reservoir Conditions

## HYDROLOGIC CONDITIONS BELOW AVERAGE

### Hydrology

As of January 29, 2018

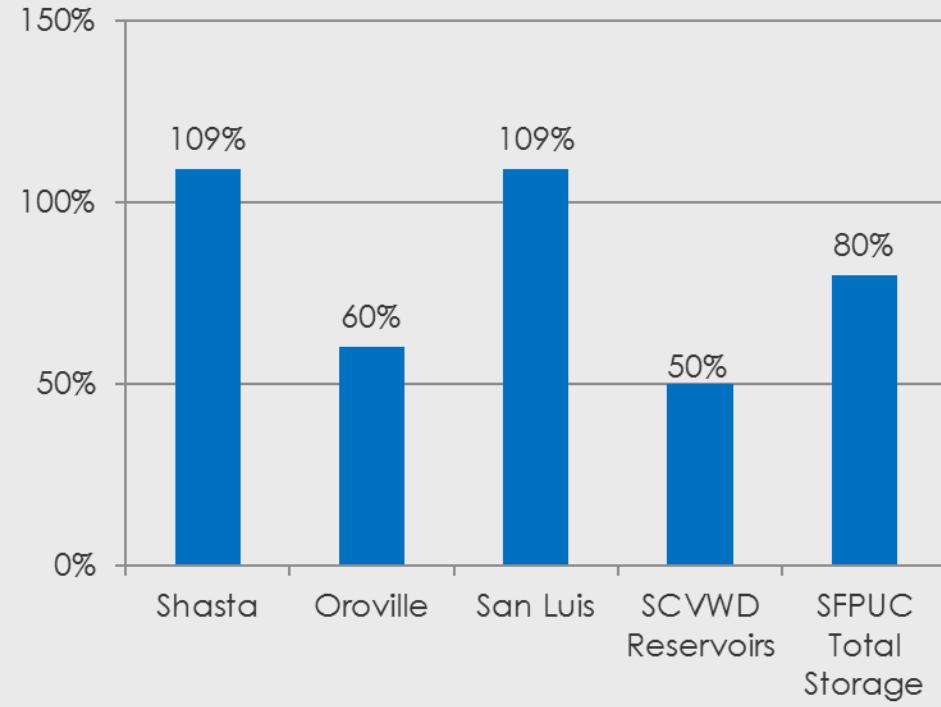
■ Normal to Date      ■ Current to Date



### Reservoir Storage

As of January 29, 2018

■ Current as % of Average to Date



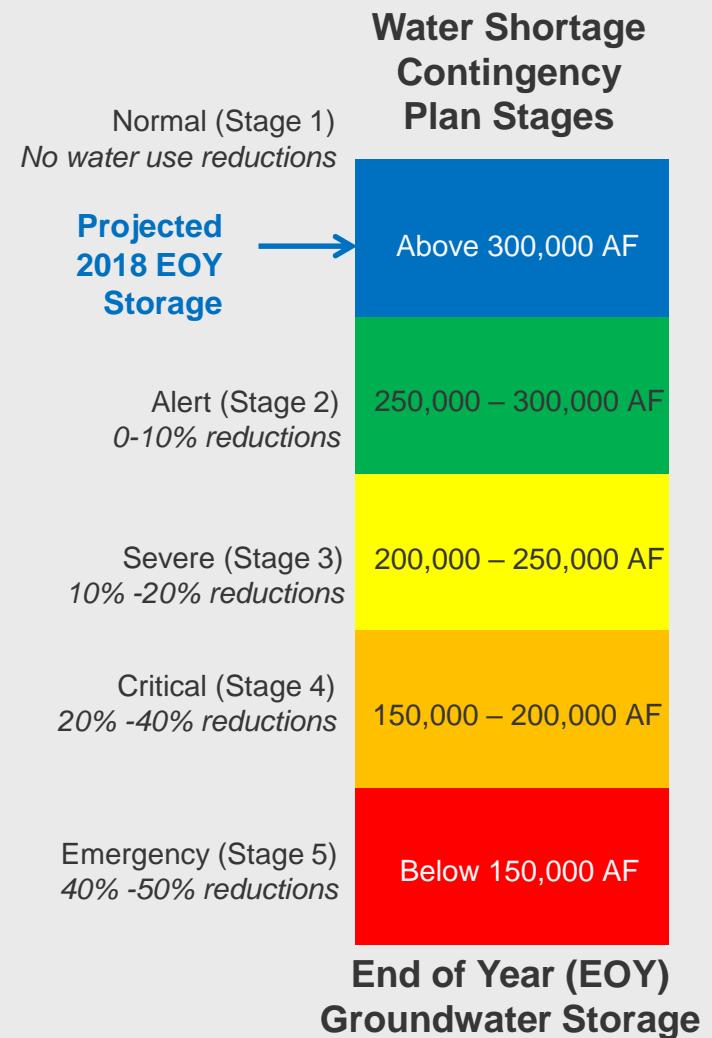
# 2017 Retail Water Use and Reductions

THE COMMUNITY HAS EXCEEDED THE CALL FOR 20%!

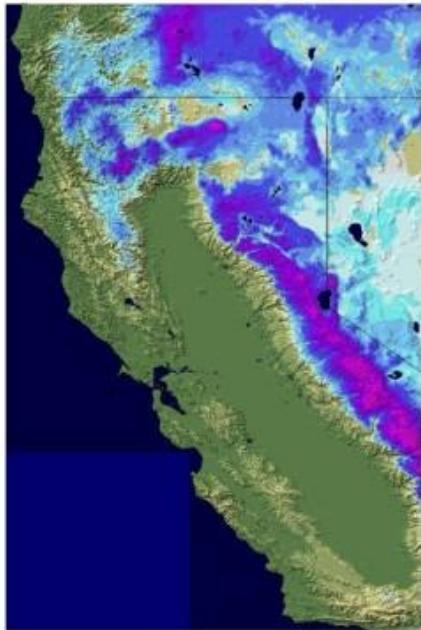
<u>2017</u>	<u>North County Ground water</u>	<u>South County Ground water</u>	<u>Treated Water</u>	SFPUC	SJWC Surface	<u>2017 Monthly Use</u>	<u>2017 Cumulative Use</u>	Cumulative District Source Savings	Cumulative NonDistrict Source Savings	All Sources Cumulative %Savings from 2013 <+> savings
Jan	3,194	1,283	5,993	2,446	134	<b>13,050</b>	<b>13,050</b>	-3%	51%	15%
Feb	3,164	1,145	5,097	2,276	80	<b>11,761</b>	<b>24,811</b>	7%	52%	21%
Mar	3,750	1,354	5,770	3,077	342	<b>14,293</b>	<b>39,104</b>	17%	42%	24%
Apr	5,610	1,433	4,801	3,134	317	<b>15,295</b>	<b>54,399</b>	24%	39%	28%
May	5,424	2,037	10,485	4,524	318	<b>22,789</b>	<b>77,188</b>	25%	35%	27%
Jun	6,121	2,190	11,142	5,193	271	<b>24,917</b>	<b>102,106</b>	24%	29%	25%
Jul	6,978	2,403	12,220	4,869	155.3	<b>26,625</b>	<b>128,731</b>	23%	28%	24%
Aug	6,904	2,359	12,061	5,225	73.1	<b>26,622</b>	<b>155,353</b>	22%	27%	23%
Sep	6,409	2,183	11,382	4,861	38.7	<b>24,873</b>	<b>180,226</b>	21%	25%	22%
Oct	6,274	2,062	10,269	4,078	10.7	<b>22,695</b>	<b>202,921</b>	21%	25%	22%
Nov	4,949	1,463	6,633	3,063	20.6	<b>16,130</b>	<b>219,051</b>	21%	25%	22%
Dec	6,101	1,444	4,964	3,112	143	<b>15,932</b>	<b>234,983</b>	21%	23%	21%
*Jan to Current Totals	<b>64,878</b>	<b>21,356</b>	<b>100,819</b>	<b>45,859</b>	<b>1,902</b>	<b>234,983</b>				
%Savings by Source of Supply	25%	7%	21%	16%	76%	21%				

# 2018 Initial Local Outlook

20%	- Current SWP Allocation (20 TAF)
Not available	- Initial CVP Allocation
~250 TAF	- Semitropic Storage
330-340 TAF	- End of Year Groundwater Storage



Snow Depth 01-18-2017



Snow Depth 01-18-2018



# SCVWD Board of Directors Response

- ▶ June 13, 2017, the board extended the call for 20% reductions, but removed recommendations for mandatory actions by retailers and municipalities. They also recommended that many water waste restrictions be permanent and called for making water conservation a way of life.  
Continue to make conservation a way of life

# State Transitions to Conservation as a Way of Life

## Governor Executive Order

State Board **transitions**  
**away from monthly and**  
**annual percent**  
**reductions**

**Move towards water use**  
**efficiency and water**  
**budgeting targets** after  
2020- performance based  
targets will be in place.



Making Water Conservation a  
California Way of Life

Implementing Executive Order B-37-16

FINAL REPORT  
April 2017



# Potential Permanent Prohibitions

- ▶ Prohibitions Under Consideration Include:
  - ▶ Hosing off sidewalks, driveways and sidewalks;
  - ▶ Application of potable water to outdoor landscapes during and within 48 hours after measurable (1/4") rainfall;
  - ▶ Watering landscapes in a manner that causes runoff;
  - ▶ Irrigating turf on public street medians (with certain exceptions);
  - ▶ Using non-recirculated water in a fountain or other decorative water feature;
  - ▶ Using a hose to wash vehicles without a shut-off nozzle (or equivalent)

# SCVWD Response to 2017 Summit

## ► Education/Outreach

- VOW Campaign
- Demo Garden Map Tool
- District Demo Garden – signs, online, flyer
- SouthBayGreenGardens
  - Website
- Graywater Program
  - Presentations
  - Flyers
  - Video on website



# SCVWD Response to 2017 Summit, cont.

- ▶ Landscape Rebate Program Improvements:

- ▶ Development of online application done
- ▶ Top 100 Plant list in the works



- ▶ Landscape Maintenance Consultation Program

- ▶ Research Efforts:

- ▶ Study to quantify the water savings from Landscape Rebate Program – complete, to be published soon.

# Questions

Thank you so much!!

Questions?

# Key Note Presentation

## Kevin Breen

## La Rinconada Country Club

# CONSERVATION EFFORTS AT LA RINCONADA COUNTRY CLUB

Kevin Breen CGCS

•••

*Drought planning*  
*Conservation sustainability*  
*Technology for water savings*

# Kevin P Breen

• • •

30yrs in the golf business

27yrs as a superintendent

6yrs in the south bay at La Rinconada

1987 Degree in meteorology from University of Nebraska

1992 Degree in horticulture from Colorado State

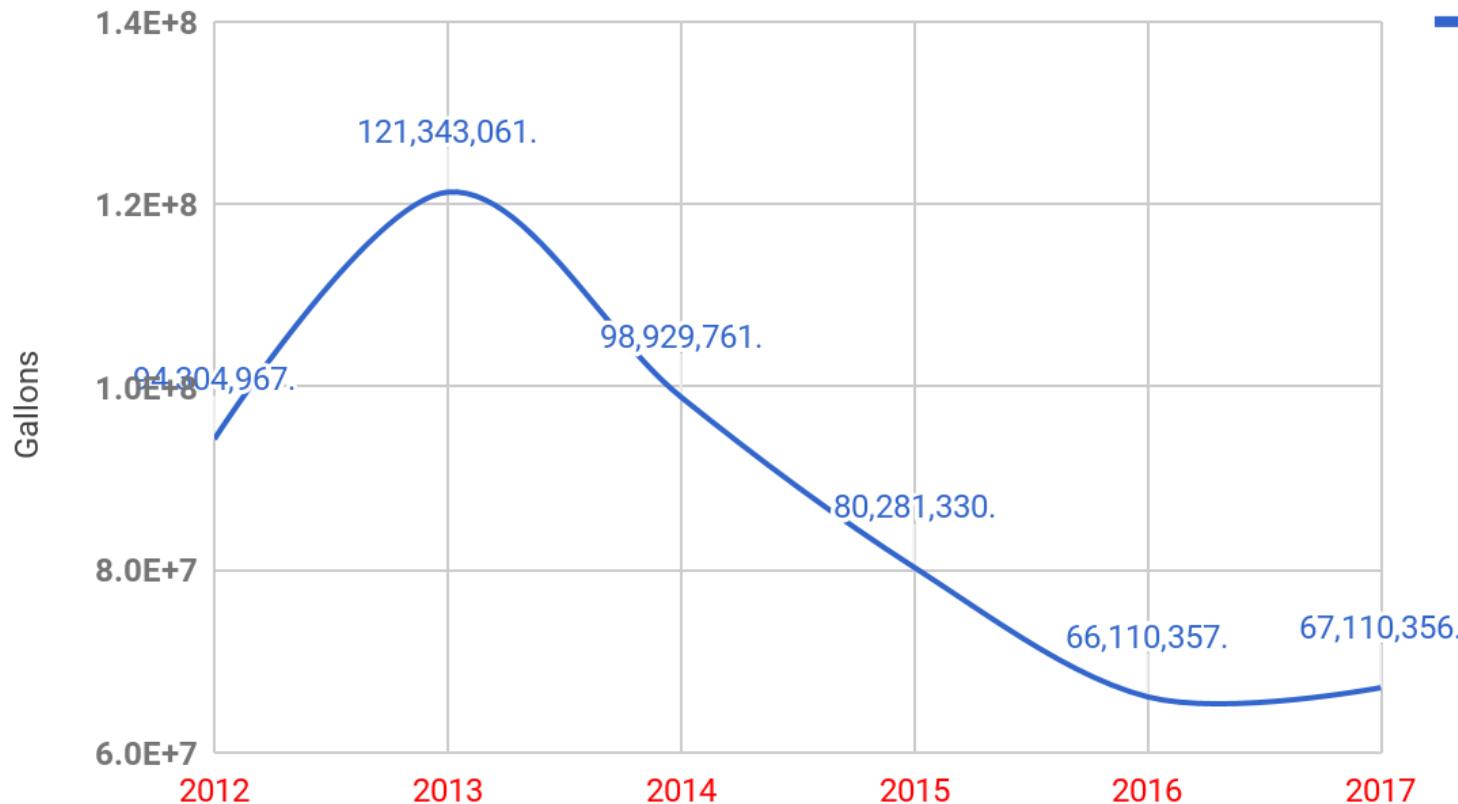
# Water Audit 2012

## Why Do An Audit?

- Rebate for irrigation control units
- To improve your product
- Establish a relationship with the water district
  - Resources the district has to offer
  - Don't wait until a crisis

# Historical water use at La Rinconada

## *Annual Irrigation 2012 through 2017*



# Drought Plan

## Groundwork

### Prioritize

- Greens, tees, fairways, roughs
- Take the hardest to water areas out of irrigation
  - Tree wells, areas where play is not occurring

### Inventory

- Measure areas using Google earth
- Estimate water savings as a percentage of area

# Conservation Area Treatments

- Native grasses
  - Fairly inexpensive
  - Plugs vs Seed
- Woody plants
  - Low maintenance and long lasting
  - Take a long time to establish
- Chipped beds
  - Can seem contrived if done poorly
  - Ongoing maintenance Color and Weeds.

# Architectural Long Range Plan



# Approved Planting List

Started with the SCVWD plant list

Chose plants appropriate for La Rinconada

Demonstrated plantings on site

Gained consensus

Now have a living document to work from

# Gaining Consensus



# Google Earth Inventory



© 2016 Google  
Data LDEO-Columbia, NSF, NOAA  
Data SIO, NOAA, U.S. Navy, NGA, GEBCO  
Image Landsat

# Native Seed areas fall 2016

Google Earth Pro

File Edit View Tools Add Help

Search

Fly To Find Businesses Directions

Fly to e.g., 37.407229, -122.107162

Places

- Seeded 2014 2015 winter**
  - #14 turbo rzn tall fescue
  - 14 olive tree right rough tall fescue
  - #17 native seed, pacific coast seed mix.  
This seed germinated in about 5 days and is doing well
    - #10 tall fescue turbo rzn
    - #2 rye turf rx
    - Native mix
    - #3 right rough Native mix from pacifi...
    - #3 right rough Turbo rzn
    - #4 right rough off tee
    - #1 right rough to chipping turbo rzn
    - #1 right rough turbo rzn
    - #15 right of green stover native mix
    - #2 tee in front
    - #2 right cart path rye
    - #8 left side
- 2011 Median Income Map
- Projects
- Projects

Layers Earth Gallery

© 2015 Google

37°15'38.87" N 121°58'32.26" W elev 262 ft

Eye alt 4351 ft

# Chip Bed Establishment



# Pros and Cons of Wood Chips

## Wood chips

Easy to establish these areas

Readily available

Color retention and rejuvenation

Weed growth

# Newly Established Bed



# Native Low Input Grass



# Test and Demonstrate



# Drone Considerations

Develop your own or contract?

Getting your FAA UAV License

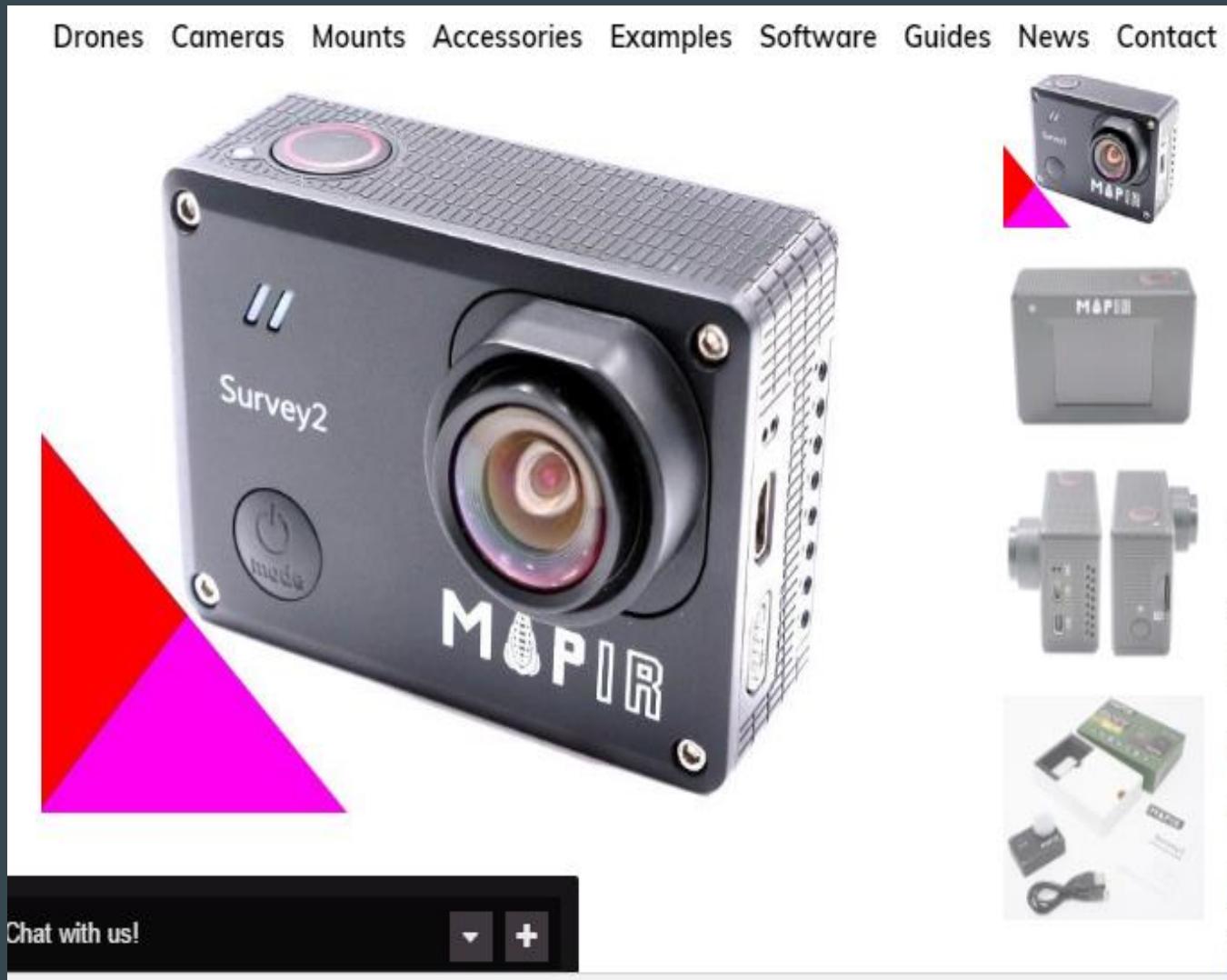
Technology changes fast

# Off The Shelf Customized



# Camera For Agricultural Survey

Drones Cameras Mounts Accessories Examples Software Guides News Contact



Survey2

MAPIR

Chat with us!

▼ +

# Program Flight Plan



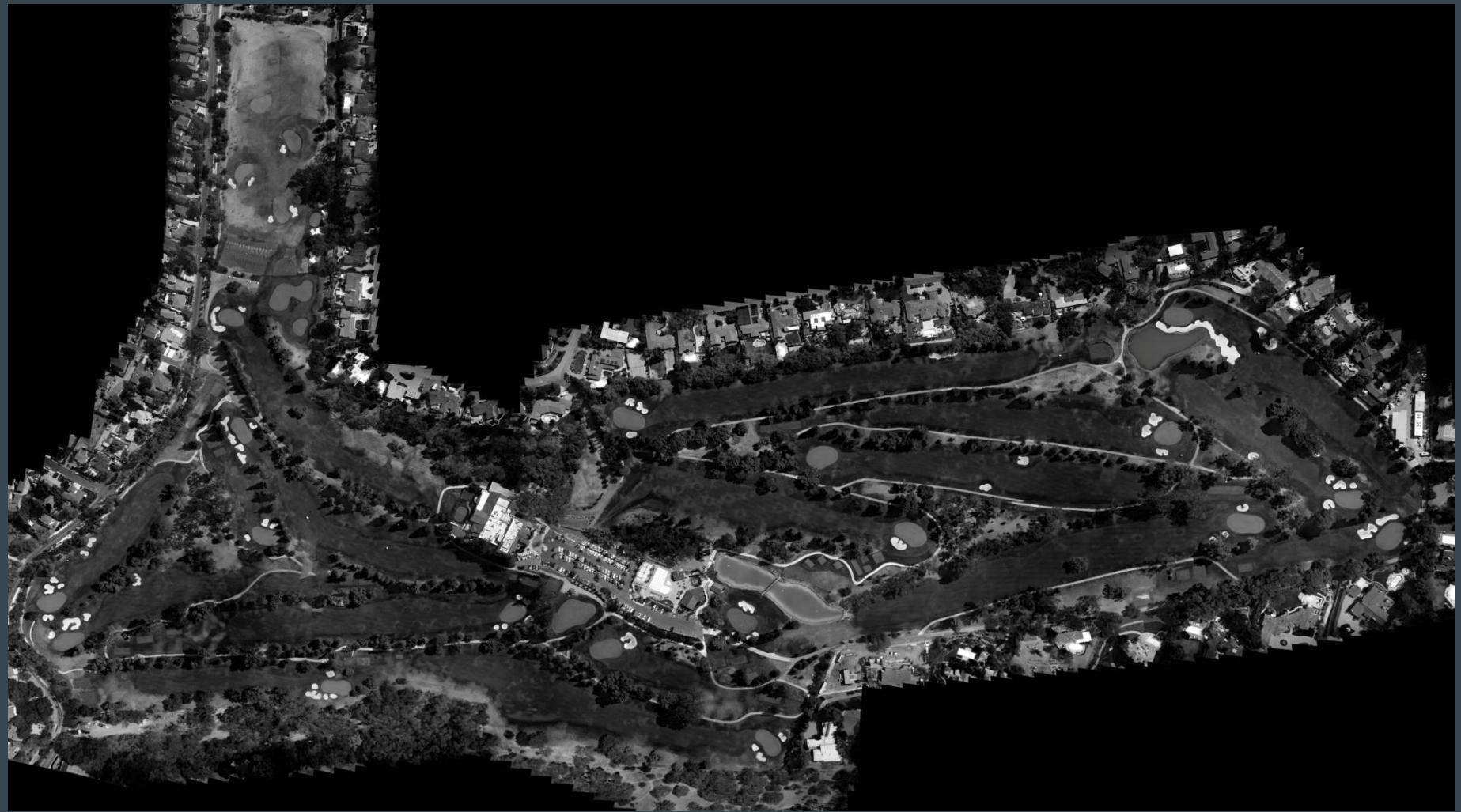
# Flight Plan

Altitude is just below 400 feet.

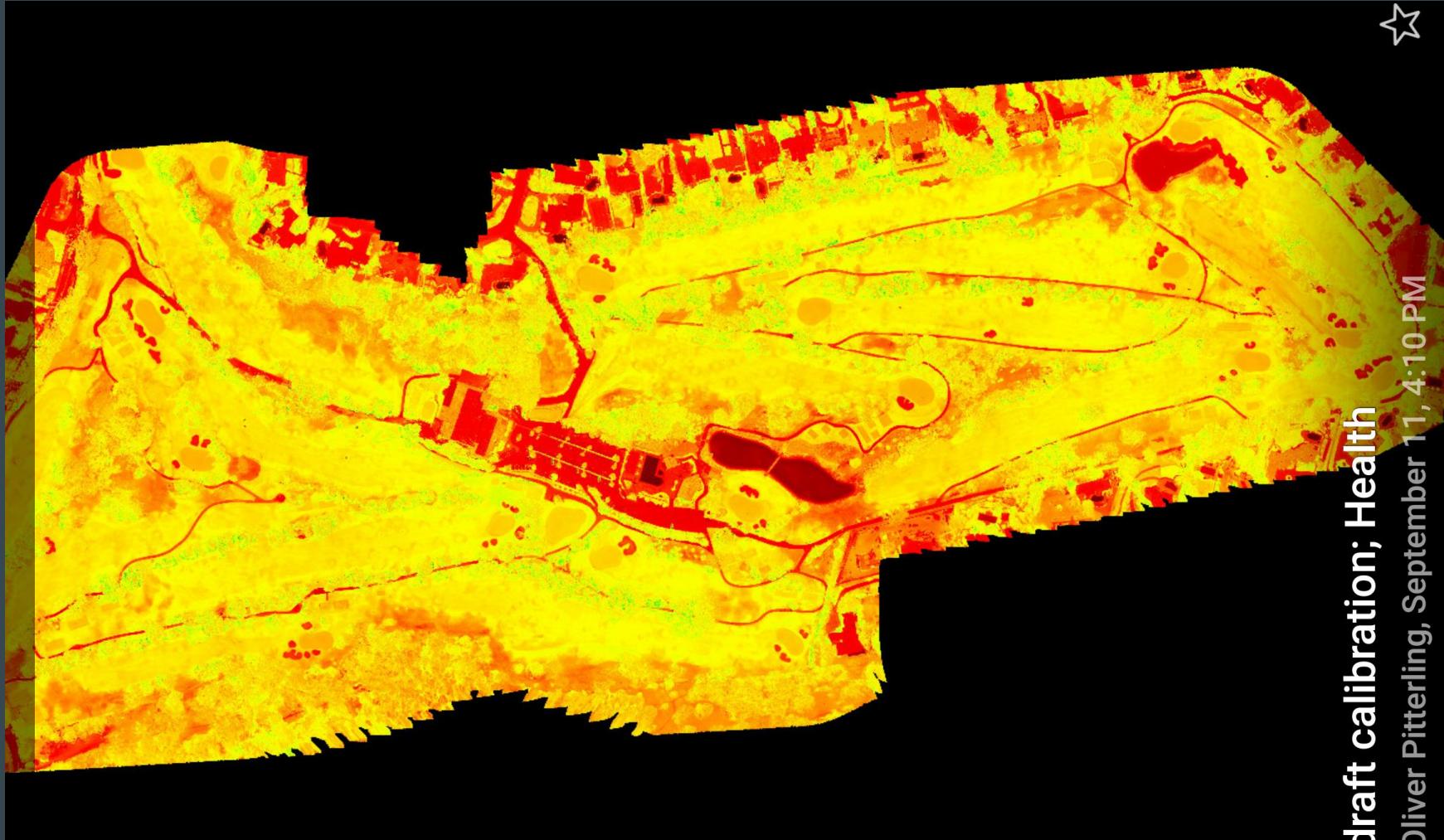
22 minutes to cover the entire golf course

Over 400 photos taken at high resolution

# Raw Stitched Photos



# Color Enhancement



# Drone Contracting

Cost of contracting vs. Owning

They keep all the technology current

UAV maintenance service

Insurance, FAA registration, etc. taken care of

Still need a UAV pilots license

New startups

# Contracted Agriculture Survey

They own the drone

The drone has an autonomous flight plan that you observe

Contract only parts of the year that are relevant

Service and upgrades

# Low Budget Alternatives To Drone

Touch it ... Feel it ... Smell it... Still the best

It just takes time to get around

Communicating what you are observing takes time

How about some time savers????

# Google Earth Monitor and Inventory

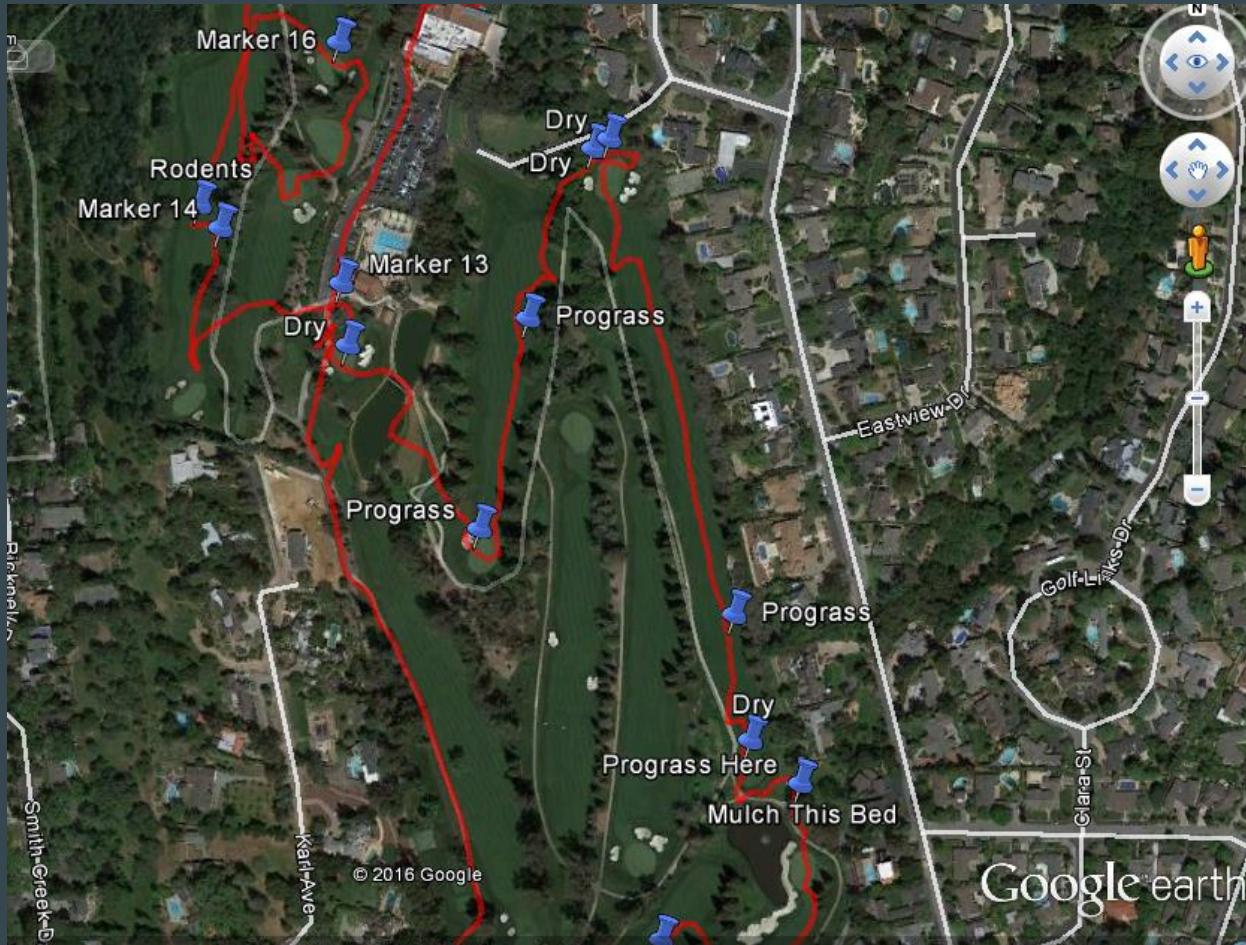
## ② 3D Viewer

- Record virtual flyovers with projects proposals using photo tools

- My Tracks and Geo Tracker

- Insert pins on work areas
- Can share using
  - Email
  - Shared folder
  - Google earth overlay with irrigation map layer

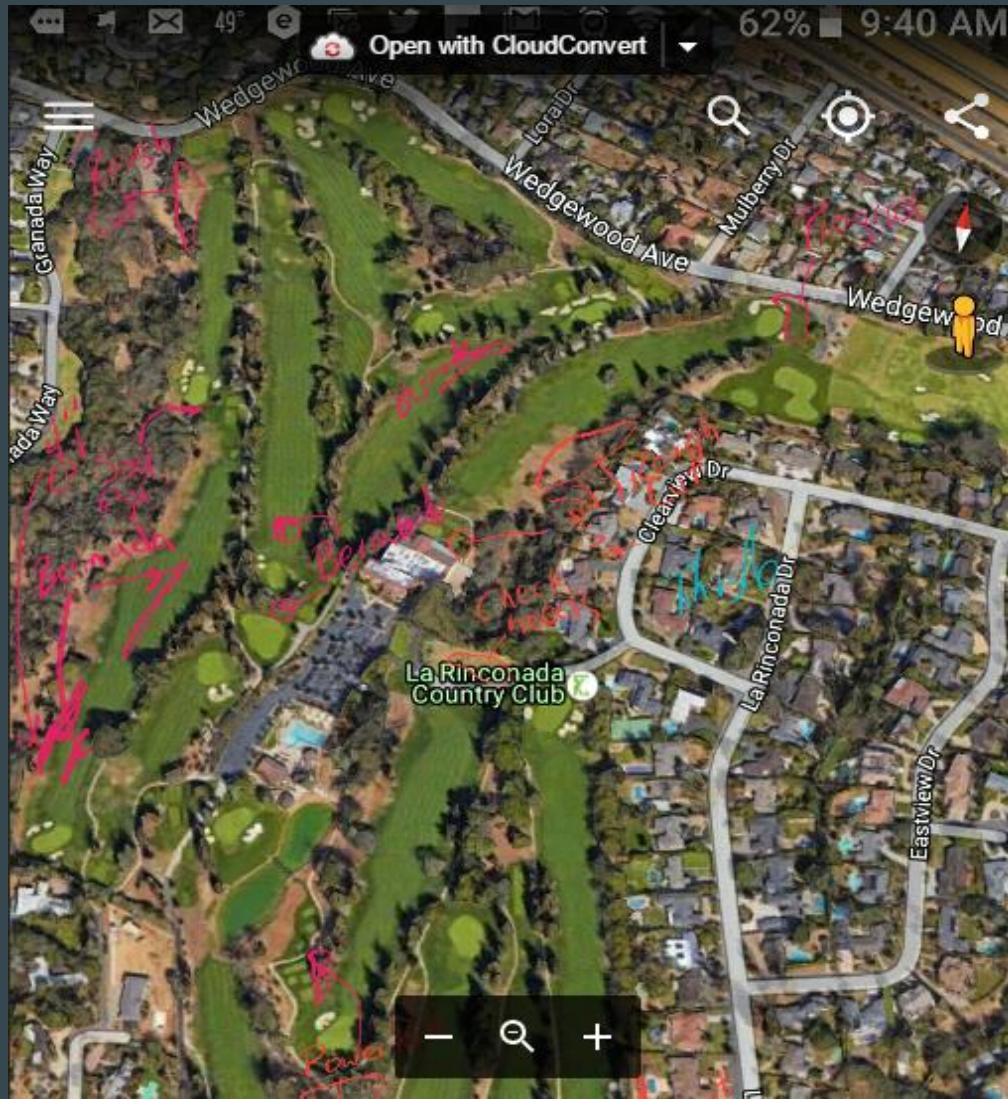
# My Tracks or Geo Tracker for Site Survey



# Screen Write

- Can use any device that you can write on screen using annotation app.
- For Google I use a note 5 phone
- For Apple I use I Annotate
- Then e mail for delegation

# Annotated Aerial for Work Tasks



# 3D Viewer Using Space Mouse



© 2016 Google  
Data: LDEO, Columbia, NSF, NOAA  
Data: SIO, NOAA, U.S. Navy, NGA, GEBCO  
Image: Landsat

# Let's Review

Start conservation before there is a crisis

Plans. Drought management, plant lists, consensus and demonstration areas

Drones will be good but do they make sense for you now?

Alternatives using free mapping, and communication tools

# Final Thoughts

## Conservation Has No End

A desire to do better

The ability to balance conservation and product quality

It shouldn't be a burden

# Thank You



Kevin P Breen CGCS

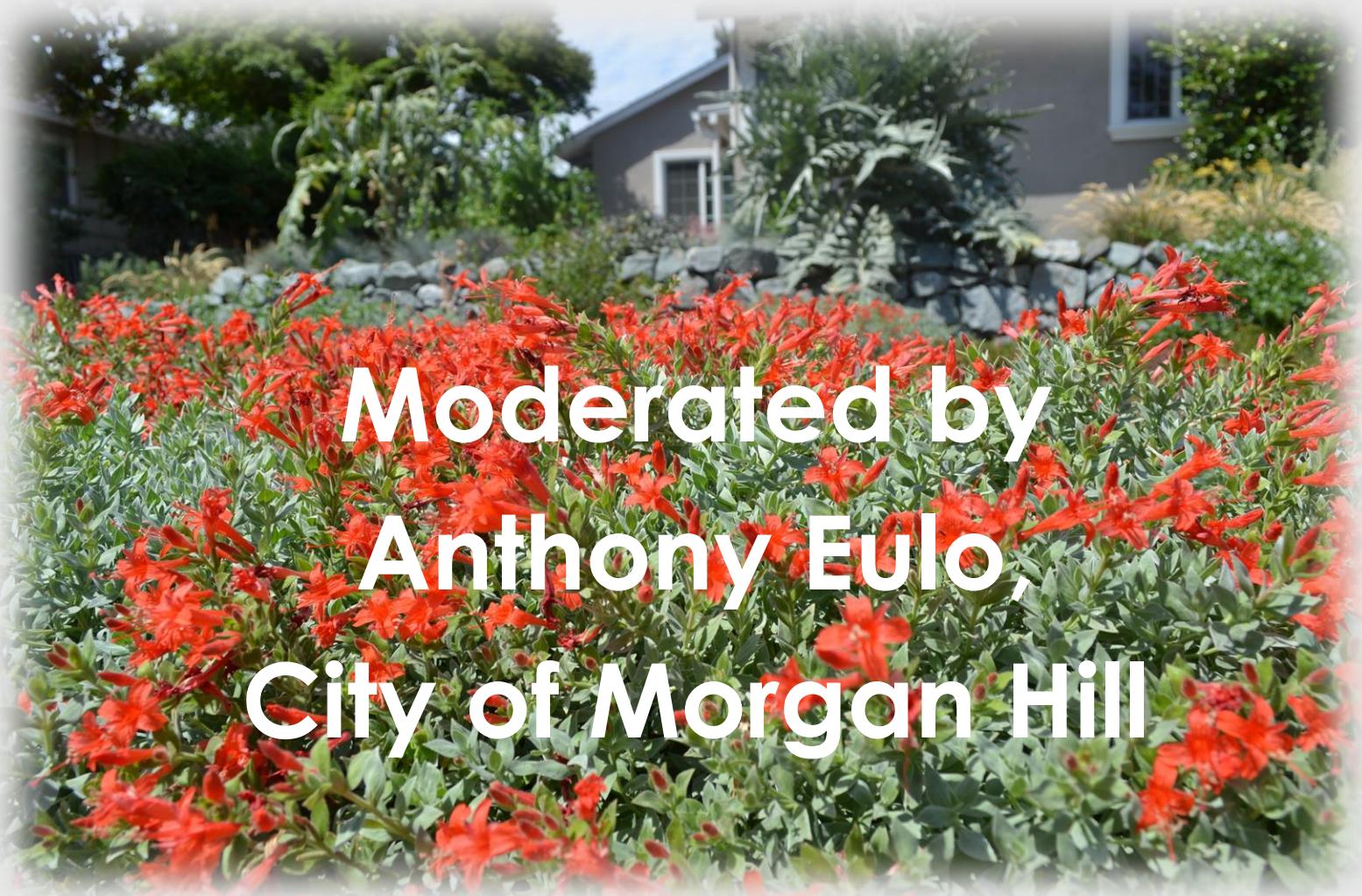
[kpbreen1@gmail.com](mailto:kpbreen1@gmail.com)

530 448 0124

# Break time



# LANDSCAPE CASE STUDIES



Moderated by  
Anthony Eulo,  
City of Morgan Hill

# Samuel Anderson

Gachina Landscape Management

# Oak Creek Apartments

Case Study in Water Management and Sustainable Landscape Best Practices



# Rebates

- Used SCVWD Hardware Upgrade
  - Weather based irrigation controllers
- Used SCVWD Landscape Conversion
  - “Cash for Grass”
- Maxed out all available SCVWD funds for the site \$50,000
- We had to wait for the FY '15 program to replenish funds and start new FY '16 to start



# Turf Conversions

- Removed over 20,000 square feet of turf
- Capped old spray and rotor heads
- Converted to Drip Irrigation
- Used Low-Water approved plants
- Layer of cardboard and mulch installed water improved retention
- Implemented a full Bay-Friendly approach to turf conversion

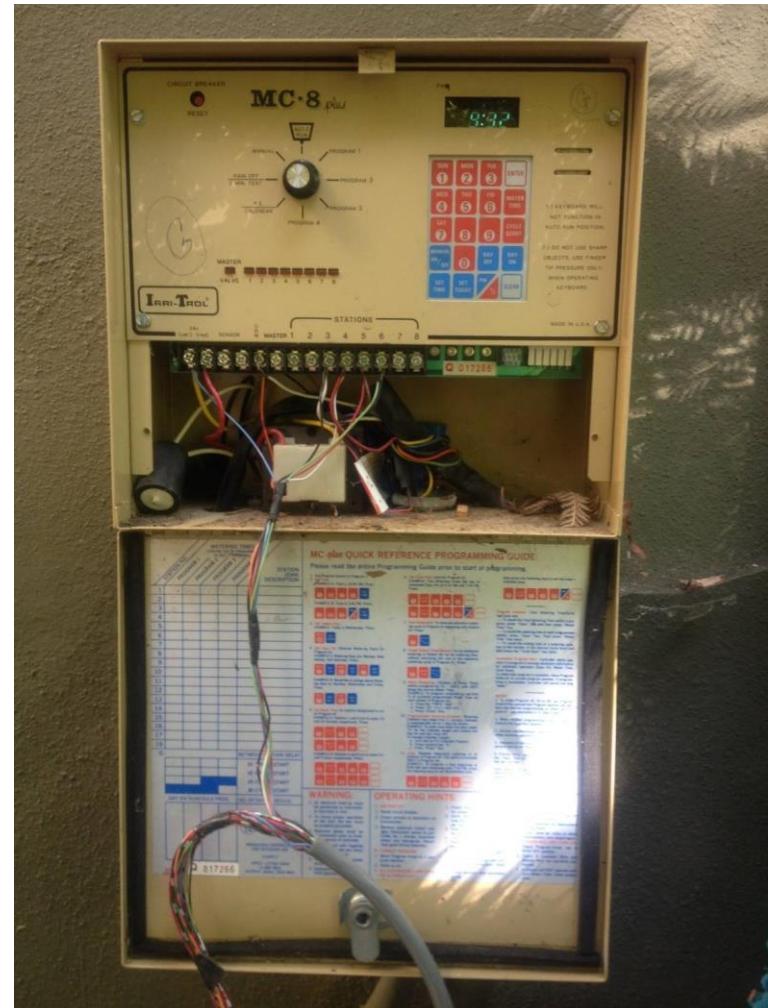


# Before and After



# Controllers

- Replaced 28 very old controllers
- Replaced with WeatherTRAK Pro3
- Programmed for Water Day Restrictions
- Optimized Water Windows to prevent overtaxing hydraulics
- All 162 valves on the 28 controllers pull water from a single 4" POC



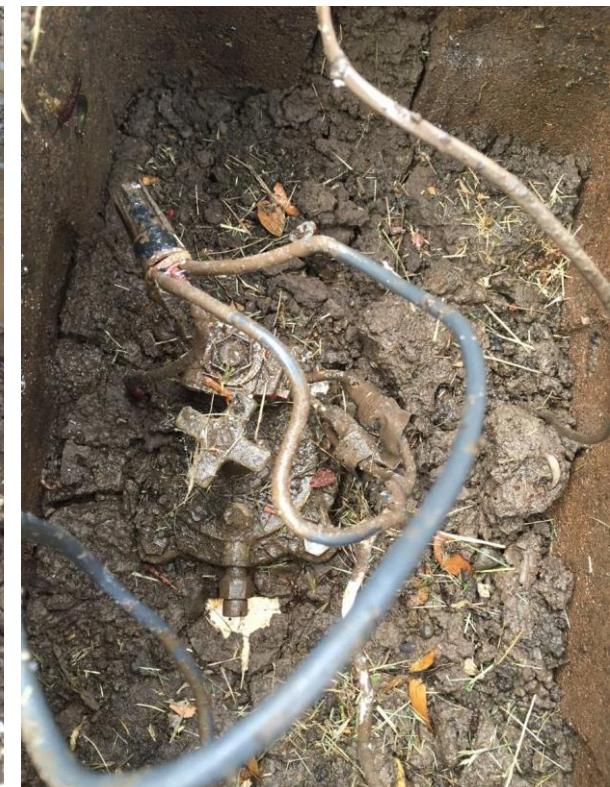
# Valves

- Removed many battery operated timers
- Removed or upgrading Add-A-Zone devices
- Replaced old solenoids causing high current alarms
- High current was damaging old controllers without our knowledge
- Replaced more than 25 valves



# Wiring Fixes

- Lots of nicked wires causing shorts
- Many disconnected valves
- Lots of battery operated valves removed
- Improper wire connectors
- Added missing splice boxes where none existed but we had direct buried splices



# Management Team

- WeatherTRAK Mobile App
- Real-time data via email
- Visibility into runtimes and alarms
- Consolidate 3 controllers into 1 for easier management
- Took full advantage of new technology



## Oak Creek honored with National Landscape Award

- Received a Merit award from NALP for large multi-residential in the maintenance category
- Award was based on maintenance quality, best practices, overcoming challenges to the site such as drought restrictions, etc.
- Partnership between Gachina LM, Oak Creek management, HydroPoint and SCVWD was critical in the achievement of this award





## Oak Creek Apartments Measurement & Verification

Do it Right. Save More.



# M&V Analysis Summary

- **Water Savings**
  - Oak Creek Apartments analyzed, yielding an estimated total savings of
    - **5 million gallons of water saved, or 16% on total baseline**
    - **\$51k in estimated cost savings**
  - Savings analysis starts in May 2016
  - Adjusting settings and addressing alerts may yield more savings
  - Additional savings from operations, plant and property protection not reflected in these numbers
- **Precision Automation Protects Landscape Health**
  - The right amount of water at the right time is critical for healthy landscapes and to minimize plant loss/replacement and unplanned costs
- **Central Internet Control Increases Operational Efficiency**
  - Alerts and dashboards deliver easy discovery of underlying irrigation system issues (improper settings, leaks, breaks, etc.) before waste and damages occur
  - Automatic reporting highlights opportunities to find additional savings and to be proactive
  - Compliance monitoring helps keep on top of possible regulation violations and avoid fines



# Sherry Bryan

Ecology Action



Helping  
people  
act now.

# Santa Clara Valley Water District Landscape Summit 2.1.2018





## 4 Projects

**1**  
Residential



**2**  
Commercial



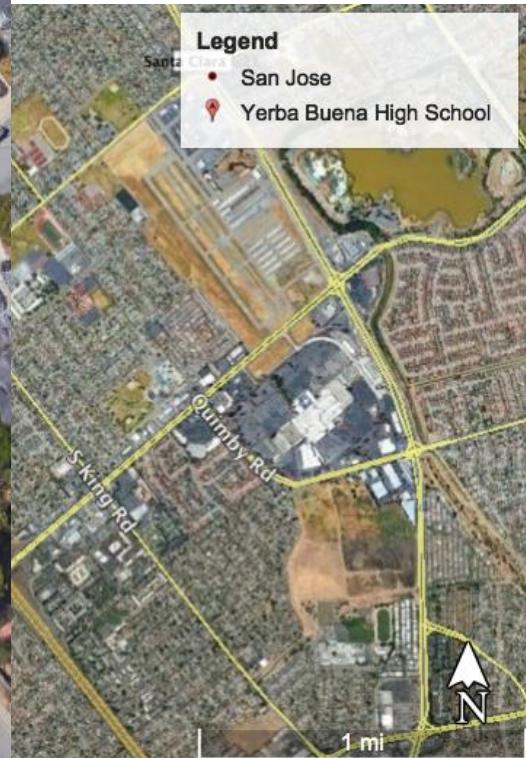
**3**  
Turf Replacement



**4**  
Ozone Laundry



# Yerba Buena HS Turf Retrofit Project Location



————— *Helping People Act Now* ———

## TERRA Project Funding Partners



**Santa Clara Valley  
Water District**



————— *Helping People Act Now* —————

# California Conservation Corps is a Key Partner



## Project Budget

**\$ 4/ft<sup>2</sup> x 7,560 ft<sup>2</sup> = \$30,240**

- \$2 ft<sup>2</sup> from SCVWD
- \$2 ft<sup>2</sup> from DWR
- CCC Rate = \$20/hour/crew member
  - 10 hour days
  - 10 crew members per day minimum



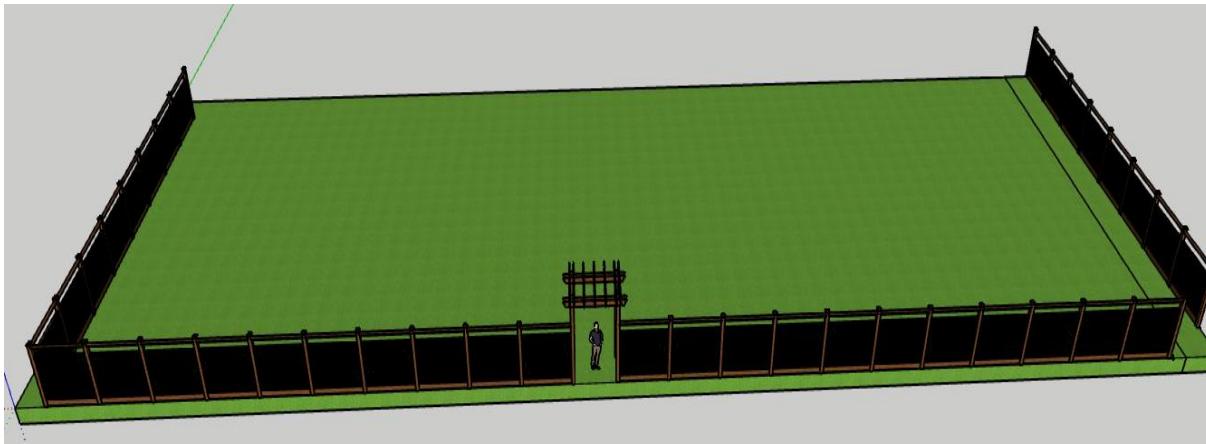
**FUTURE HOME OF TERRA PROJECT**  
**Yerba Buena High School**  
(Teaching Environmentally Responsible and  
Respectful Attitudes)



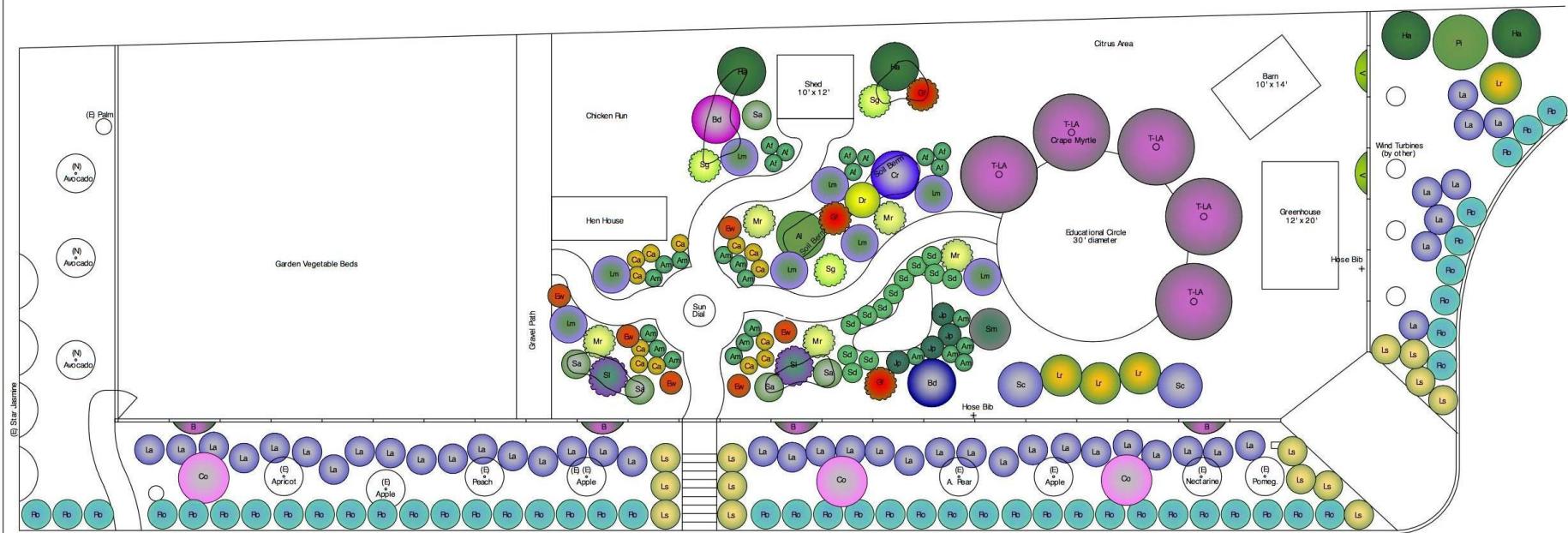
# TERRA Project – Yerba Buena High School, San Jose Pre-Construction



Pre Project Water Use = 308,844 gal/year  
(0.94 AF/year)



**TERRA – Original Student Sketch Up Design**



## Yerba Buena High School Turf Area Conversion Project

Date: 9/14/2017  
Scale: NTS



Stephanie L. Morris  
Landscape Architect # 4580  
Campbell, California  
[www.nativeplantdesign.com](http://www.nativeplantdesign.com)  
(408) 206.5055

# **TERRA Project Scope of Work**

**Site Preparation - By Yerba Buena High School Students and Staff**



# **TERRA Project Scope of Work**

**Site Preparation - By Yerba Buena High School Students and Staff**



## **TERRA Project Scope of Work**

### Site Preparation – Edging for Sheet Mulching



# **TERRA Project Scope of Work**

## **Site Preparation – Irrigation Retrofit**



## **TERRA Project Scope of Work**

### Irrigation Infrastructure Retrofit



Recycled Water Irrigates Ornamentals and Fruit Trees  
Outside Fence



## **TERRA Project Scope of Work**

### Irrigation Infrastructure Retrofit



Potable Water Zones Created for Ornamental Landscape Inside Fence



## **TERRA Project Scope of Work**

### Irrigation Infrastructure Retrofit



Hunter 6-Station Node Controller Powered by Solar Panel

## **TERRA Project Scope of Work**

### Completed Planting



————— *Helping People Act Now* ———

## **TERRA Project - Yerba Buena High School, San Jose**

### Completed planting and permeable pathways



## **TERRA Turf Retrofit Estimated Project Savings**

**238,000 gallons/year (0.73 AF)**

**14.6 AF over 20 years!**

**0.35 MTCO<sub>2</sub>e from reduced water pumping**  
**9.2 MTCO<sub>2</sub>e from reduced mowing maintenance**



## **TERRA Project Challenge – Labor Shortage and Delays**



## TERRA Project Challenge - Permeable Stair Entry





Thank you!

Sherry Lee Bryan

[sbryan@ecoact.org](mailto:sbryan@ecoact.org)

[www.ecoact.org](http://www.ecoact.org)

ARTICLES   ABOUT   SANTA CLARA VALLEY WATER DISTRICT



## SANTA CLARA VALLEY WATER NEWS

POSTED ON DECEMBER 15, 2017 BY VALLEY WATER NEWS

# PROJECT TERRA: POSSIBLY, THE BEST LANDSCAPE PROJECT EVER



# Sherri Osaka

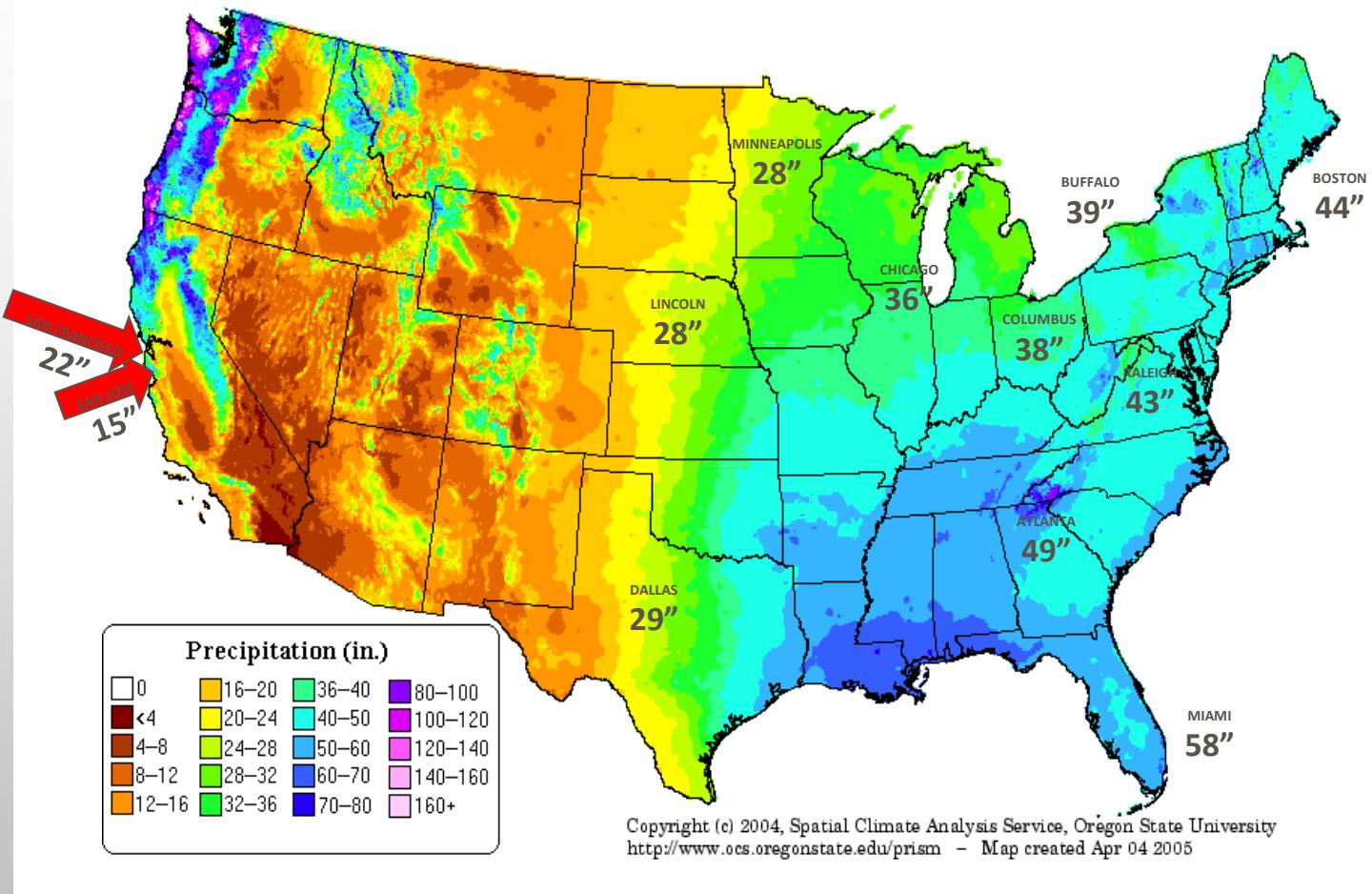
## Sustainable Landscape Design

# SAVING WATER FOR OVER 20 YEARS

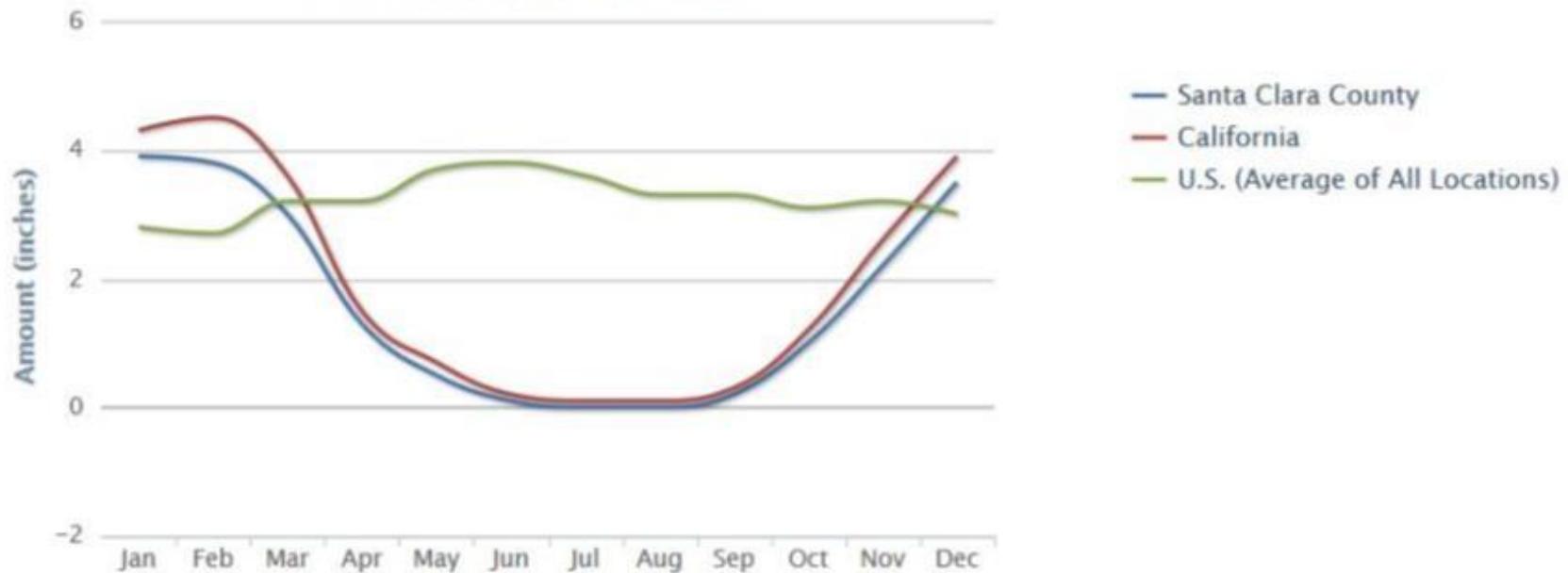
100,000 GALLONS / YEAR

SHERRI OSAKA, LANDSCAPE ARCHITECT, SUSTAINABLE LANDSCAPE DESIGNS

# ANNUAL PRECIPITATION



## Total Monthly Precipitation



<http://www.usa.com/santa-clara-county-ca-weather.htm>

CCF = 100 cubic feet  
1 CCF = 748 GALLONS  
OF WATER  
1 CF = 7.48 GALLONS



110 W. Taylor St.  
San Jose, CA 95110-2131  
(408) 279-7900  
Office Hours: 8:00AM-5:30PM Mon.-Fri.  
[www.siwater.com](http://www.siwater.com)

Customer Name: SHERRI D OSAKA  
Account Number: 7289800000-4  
Bill Date: 12/14/2017  
Amount Due: \$106.40  
Payment Due By: 01/04/2018

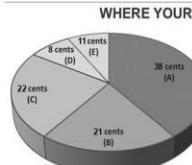
**BILLING INFORMATION**

**Service Address:** 1628 Laurelwood Dr  
**Billing Period:** 10/05/2017 - 12/08/2017  
**Rate Code / Service Size:** RES\_T\_B 3/4 Inch  
**Meter Reading**

**CURRENT CHARGES**

Service Charge	\$50.90
Quantity Charges	
6.00000 X \$4.2878	25.72
3.00000 X \$4.7642	14.29
Safe Drinking Wtr Ln 2006-B	0.08
Safe Drinking Wtr Ln 2008-B	0.04
Rate Assist Prog Surcharge-B	2.90
SCVWD Purchased Water - 2016	2.27
SCVWD Ground Water - 2016	1.52
SCVWD Purchased Water - 2017	1.31
SCVWD Ground Water - 2017	0.88
PUC Surcharge 1.44%	1.43
City Utility Users Tax 5%	5.06
Current Charges	106.40
Previous Balance	129.54
Payments Received 11/03/2017	129.54 CR
<b>Total Due</b>	<b>\$106.40</b>

## INFORMATION & ANNOUNCEMENTS



- (A) Water Supply Costs
- (B) System Improvements
- (C) Operating Costs
- (D) Cost of Capital
- (E) Taxes and Fees

## CONSUMPTION HISTORY

	Units (CCF)	Gallons	Days	G
Current	9	6732	64	
Last Year	8	5984	65	



**SJJ** San Jose  
Water  
Company

**Please Return This Portion With Your Payment**

Payment Due By  
01/04/2018

Total Due  
**\$106.40**

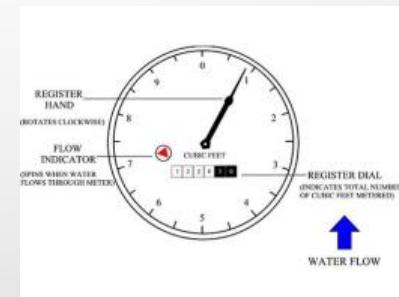
**Make Payment to:**  
  
SAN JOSE WATER COMPANY  
110 W. TAYLOR ST

SHERRI D OSAKA  
1628 LAURELWOOD DR  
SAN JOSE CA 95125-4949

Page 1 of 1

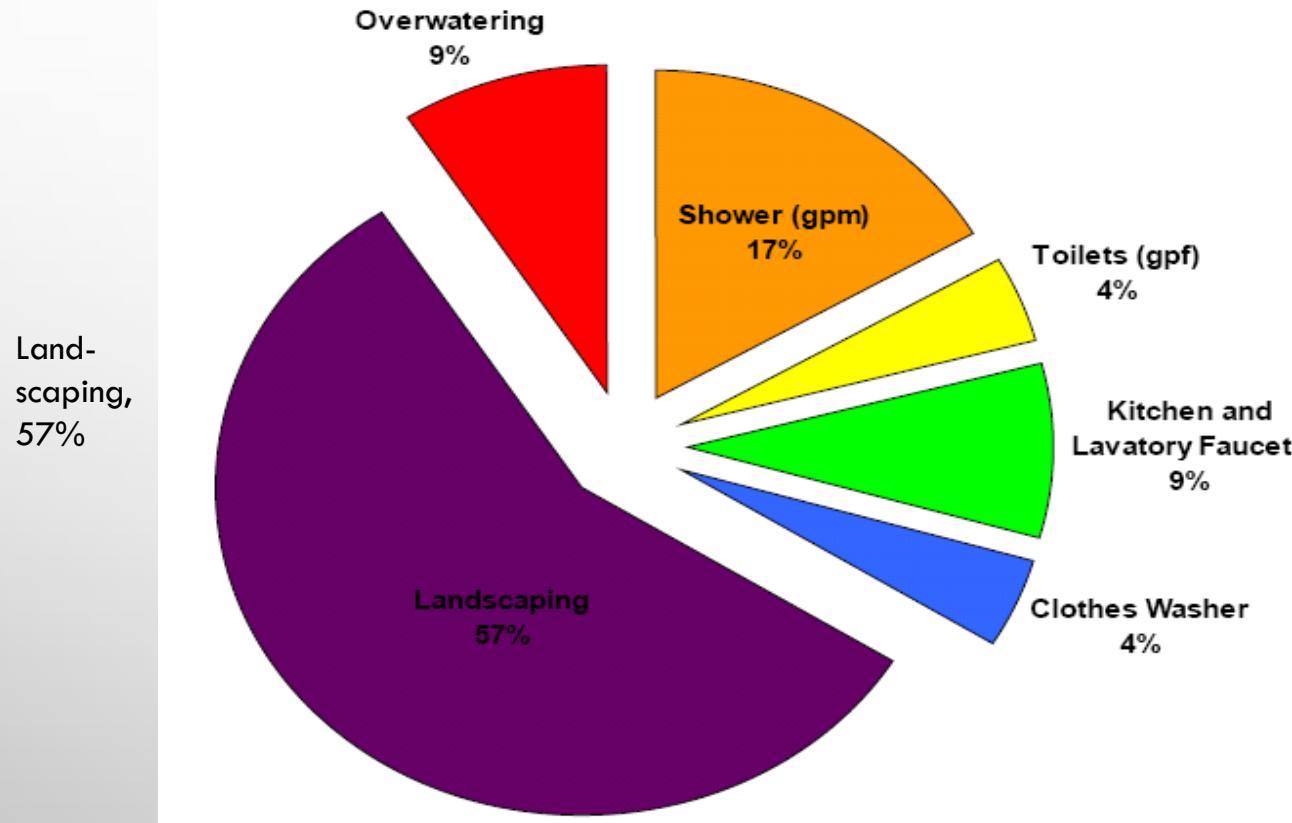
# CHECK FOR LEAKS

## READ YOUR WATER METER ONCE PER YEAR

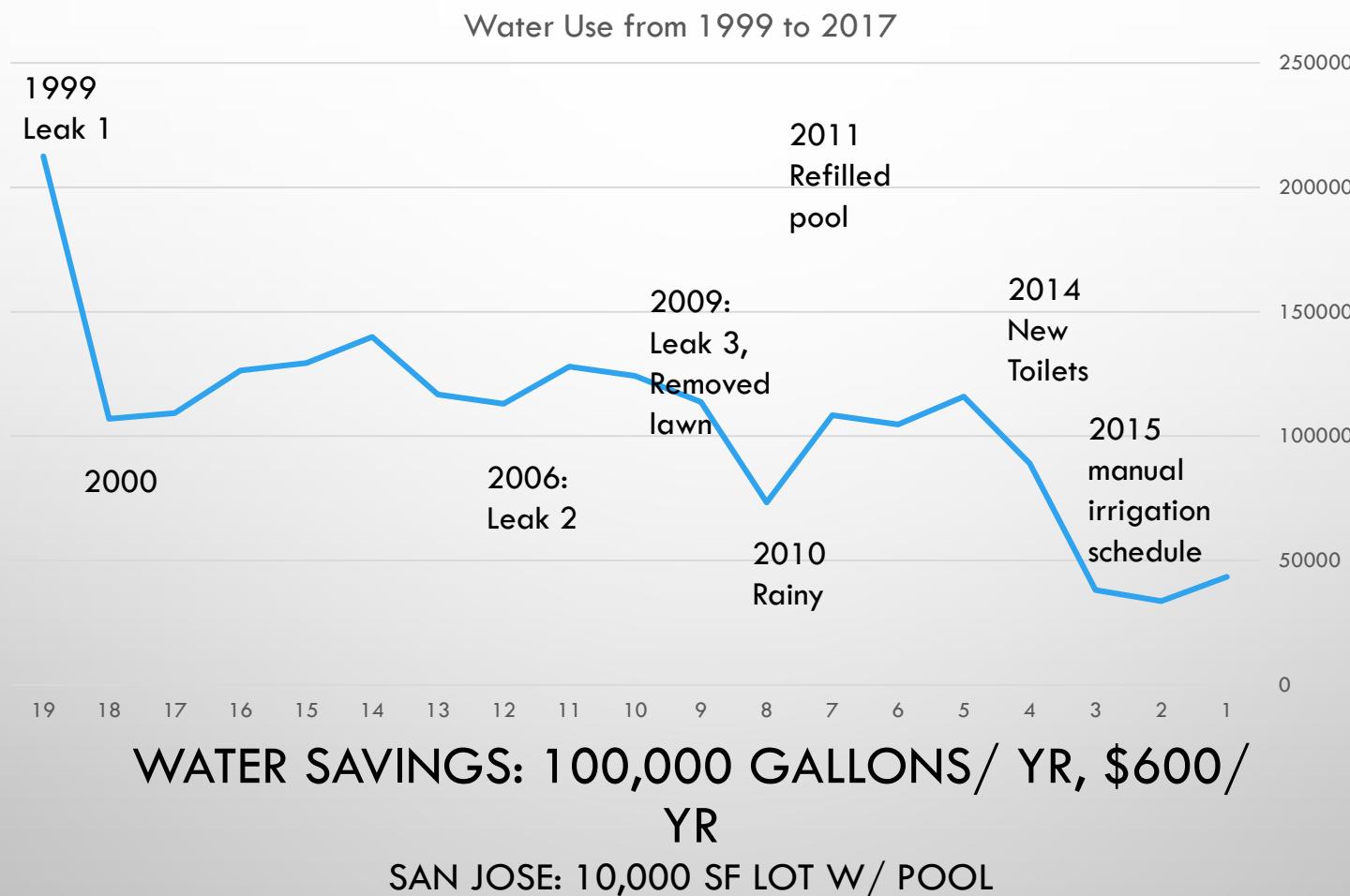


EPA says that one in every 10 homes has a leak that is wasting at least 90 gallons of water per day.

## New Home Water Use - 174,000 Gallons/year



Source: California Building Industry Association report, January 2010





Before circa 1994



**Before circa 2007**



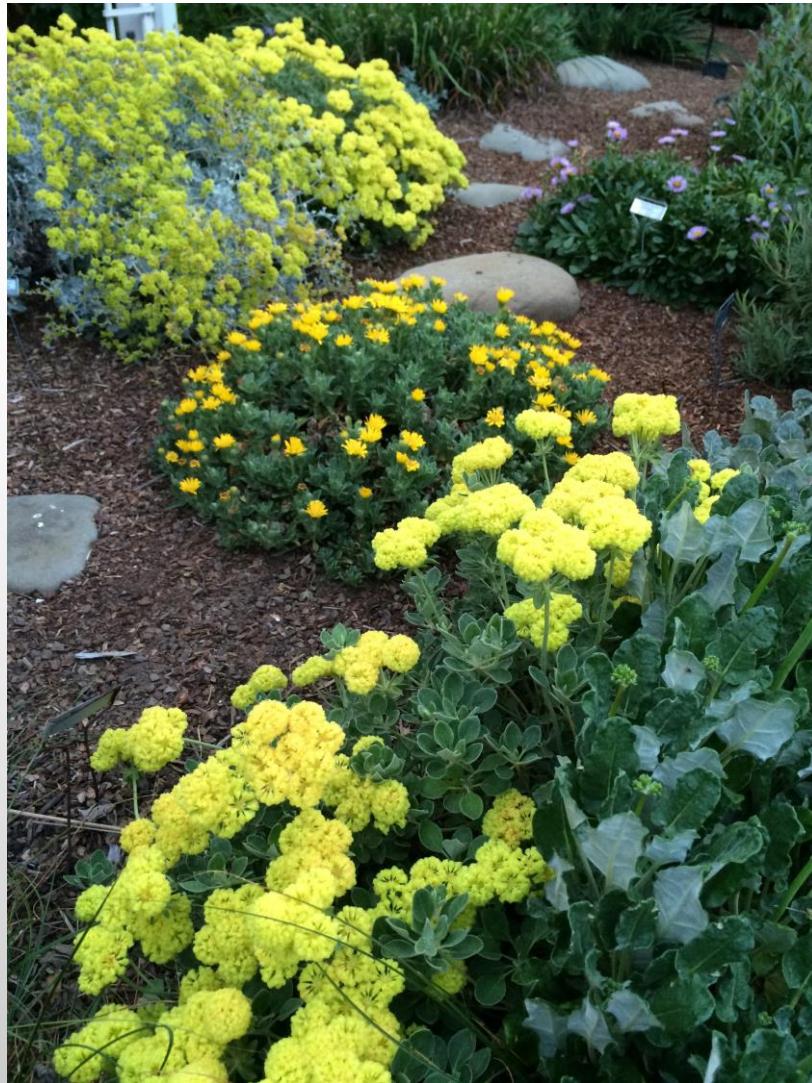












The California Native Plant Society (Santa Clara Valley Chapter)  
in association with  
UCCE Master Gardeners of Santa Clara County  
present the

**14<sup>th</sup> Annual  
Going Native  
Garden Tour**

**Saturday, April 9, 2016, 10am-4pm:**  
**Sunday, April 10, 2016, 10am-4pm:**

**SPONSORS:**  
 Bay Area Water Supply & Conservation Agency • Lyngso Garden Materials • Santa Clara Valley Water District • Santa Clara County Solid Waste Pollution Prevention Program • Friends of Master Gardeners • Gold Rush Nursery • Central Coast Wilds Nursery • East Bay Wild Nursery • Acterra • Middlebrook Gardens • Mediterranean Garden Society • Lanner Seeds

**SUPPORTERS:**  
 Don Edwards San Francisco Bay National Wildlife Refuge • Native Revival Nursery • Our City Forest • Yerba Buena Nursery • Capitol Wholesale Nursery • Gardening with Native • Alameda Valley Nursery • Bay Native Nursery • Wastewise Watch • Santa Clara Valley Audubon Society

To sponsor or support the tour, contact info@gnt.org  
 Press: James Rumbough

**VISIT HOME GARDENS WITH CALIFORNIA NATIVE PLANTS**

- WATER-WISE
- BEAUTIFUL
- HABITAT RICH
- LOW MAINTENANCE
- CHOOSE FROM OVER 50 GARDENS
- SANTA CLARA VALLEY & PENINSULA
- SELF-GUIDED TOUR
- OPEN GARDEN FORMAT

**Free admission • Register at [www.gnt.org](http://www.gnt.org)**  
**Plant sales and talks at select gardens**

Garden information, maps, and directions will become available to registrants the week of March 21. Registrations will be accepted until noon of April 10. For information, visit [www.gnt.org](http://www.gnt.org), or email info@gnt.org.




**16<sup>th</sup> Annual  
Going Native  
Garden Tour  
2018:**

**Saturday, April 7  
North**

**Sunday, April 8  
South**

- LESSONS LEARNED:
- CAREX PANSA
  - NEEDS A ROOT BARRIER
  - MOW WITH A GAS MOWER OR ELECTRIC HEDGE TRIMMERS ONCE OR TWICE PER YEAR, NOT IN LATE SPRING!
- COASTAL NATIVES NEED MORE WATER IN THE SUMMER AND SHOULD BE ON A SEPARATE IRRIGATION ZONE
- “DEAD” LOOKING COASTAL NATIVES WILL COME BACK IN THE FALL
- LOW GROWING MANZANITAS AND CEANOOTHUS ARE COASTAL
- CHAPARRAL PLANTS CAN GO WITH ALMOST NO WATER, BUT APPRECIATE MONTHLY IRRIGATION
- CREATE AREAS THAT DON’T REQUIRE IRRIGATION AFTER ESTABLISHMENT: VERY LOW WATER PLANTS SUCH AS: OAKS, SHRUBBY MANZANITAS, DEER GRASS, SUBSHRUB NATIVE SAGES, ETC.
- ORGANICALLY MAINTAINED SOIL HOLDS A LOT OF WATER AND THE SOIL LEVEL WILL ALSO RISE
- KEEP WATER ON-SITE WITH DRY WELLS, DOWN SPOUT EXTENDERS, RAIN GARDENS, ETC.

# Golden Love

Love's Gardens

# Water Neutral: A Case Study

2018 Landscape Summit

February 1, 2018

# A Water Neutral Garden uses zero municipal or well water



# Design Principle

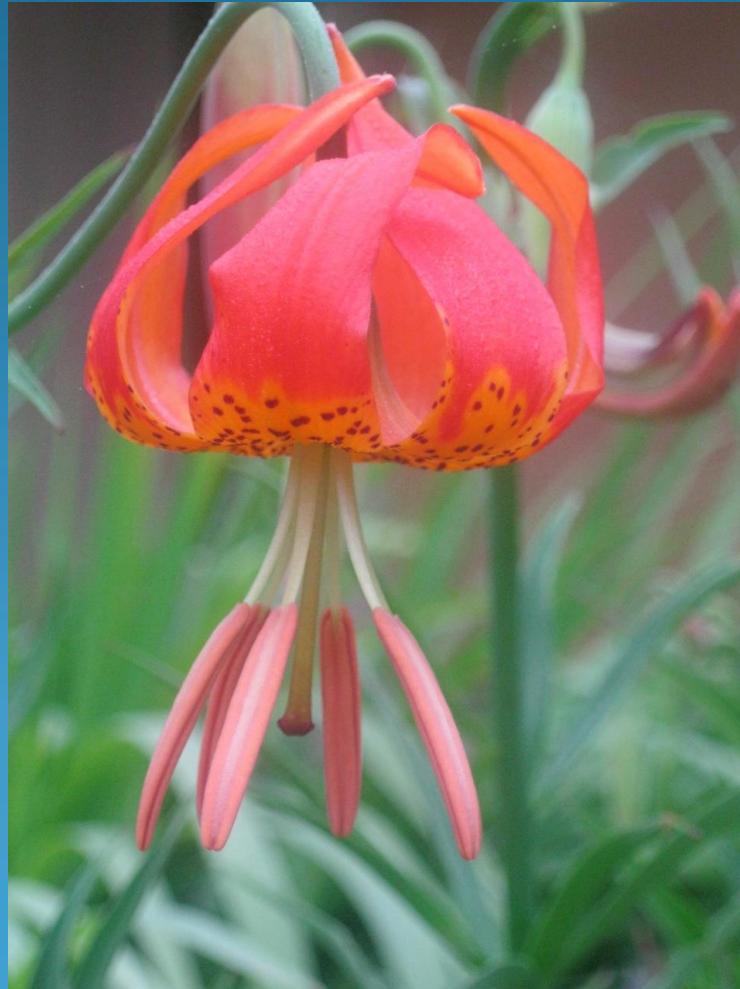
## Supply = Demand



Water Neutral is a solution,  
practical action.



It is transitional, a goal.



Guiding principles

Abundance  
& Possibilities

# Purpose of Project

- ✖Reduce environmental foot print
- ✖Save \$
- ✖Harness all possible sources of water
- ✖Reduce impact on septic system
- ✖Self-sufficiency

# Scope of Work

Harvest Grey and Rain Water

Change drip system and faucets to rainwater



# Budget and Funding

- ✖ Rain water harvesting \$7,043
- ✖ Greywater harvesting \$2,745
- ✖ Co-Creation to reduce costs
- ✖ Self funded

# Job # 1 — Site Analysis



# Most plants are low water use



# Soil is sandy loam over sandy clay loam

Map Unit Description: Elkhorn-Pfeiffer complex, 30 to 50 percent slopes—Santa Cruz County, California

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**Santa Cruz County, California**

**136—Elkhorn-Pfeiffer complex, 30 to 50 percent slopes**

**Map Unit Setting**

*National map unit symbol: h9dv*  
*Elevation: 50 to 5,000 feet*  
*Mean annual precipitation: 14 to 55 inches*  
*Mean annual air temperature: 57 to 64 degrees F*  
*Frost-free period: 245 to 275 days*  
*Farmland classification: Not prime farmland*

**Map Unit Composition**

*Elkhorn and similar soils: 45 percent*  
*Pfeiffer and similar soils: 25 percent*  
*Minor components: 13 percent*  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Elkhorn**

**Setting**

*Landform: Terraces*  
*Landform position (two-dimensional): Toeslope*  
*Landform position (three-dimensional): Tread*  
*Down-slope shape: Linear*  
*Across-slope shape: Linear*  
*Parent material: Marine deposits*

**Typical profile**

*H1 - 0 to 21 inches: sandy loam*  
*H2 - 21 to 61 inches: sandy clay loam, clay loam*  
*H2 - 21 to 61 inches:*

**Properties and qualities**

*Slope: 30 to 50 percent*  
*Depth to restrictive feature: More than 80 inches*  
*Natural drainage class: Well drained*  
*Runoff class: Medium*  
*Capacity of the most limiting layer to transmit water (Ksat):*  
*Moderately high (0.20 to 0.57 in/hr)*  
*Depth to water table: More than 80 inches*  
*Frequency of flooding: None*  
*Frequency of ponding: None*  
*Available water storage in profile: Very high (about 15.8 inches)*

**Interpretive groups**

*Land capability classification (irrigated): None specified*  
*Land capability classification (nonirrigated): 6e*  
*Hydrologic Soil Group: C*  
*Ecological site: FINE LOAMY (R014XD034CA)*  
*Hydric soil rating: No*

 USDA Natural Resources Conservation Service

Web Soil Survey  
National Cooperative Soil Survey

10/12/2017  
Page 1 of 3

# Indoor Water Consumption

- ✖ **Washing machine** 26-39 gallons per week
- ✖ **Shower** 175 gallons per week
- ✖ **Bathroom Sink** 36 gallons per week
- ✖ **Total** 237 - 250 gallons of GW per week

# Rain Water Harvesting Design Checklist

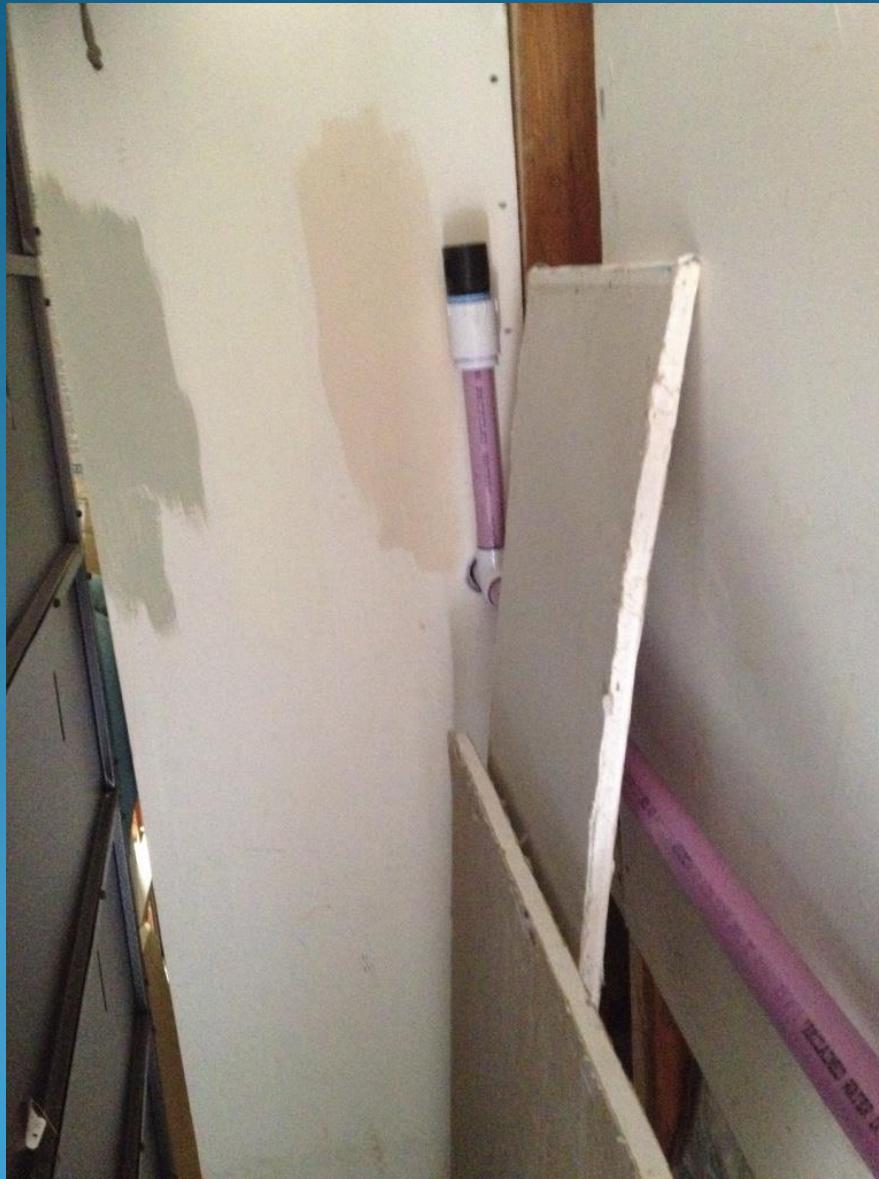
- ✖ Measure roof area, roofing material?
- ✖ Condition of gutters, do they need screening
- ✖ Locate all downspouts to be connected
- ✖ Size first flush diverter
- ✖ Volume of water from downspouts, size piping
- ✖ Location of tank(s)
- ✖ Pressure booster pump needed? Electricity
- ✖ Where is overflow going?

# Design Notes

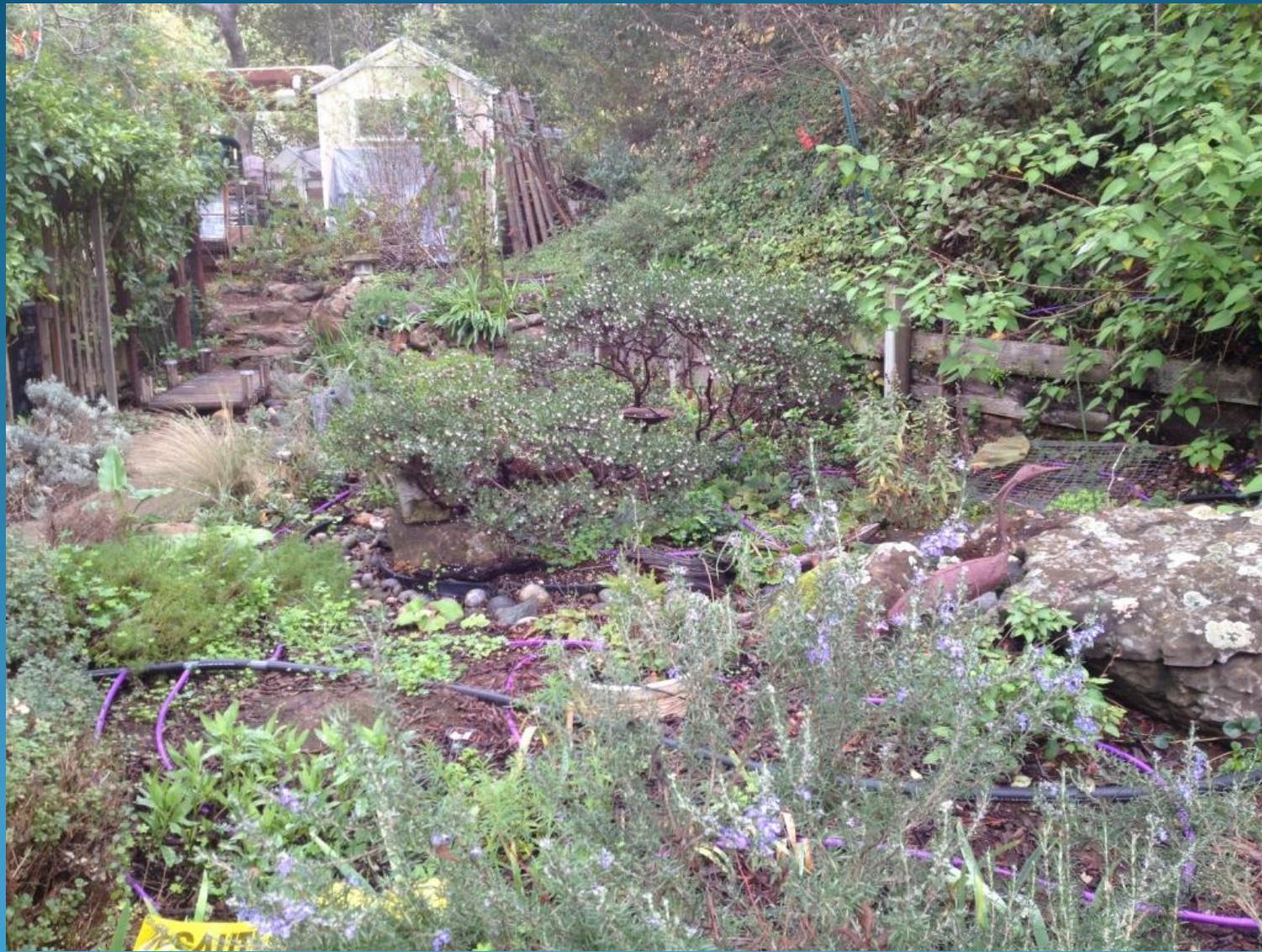
- × 1510 square foot roof
- × 14-55 inches of rain per year
- × 825 gallons per 1" rainfall
- × 11,550 - 45,375 gallons per year
- × 15.8 inches of potential storage in soil profile
- × 13,035 gallons of water per 1,000 square feet

# Greywater Harvesting









# Rainwater Harvesting













# Water Savings

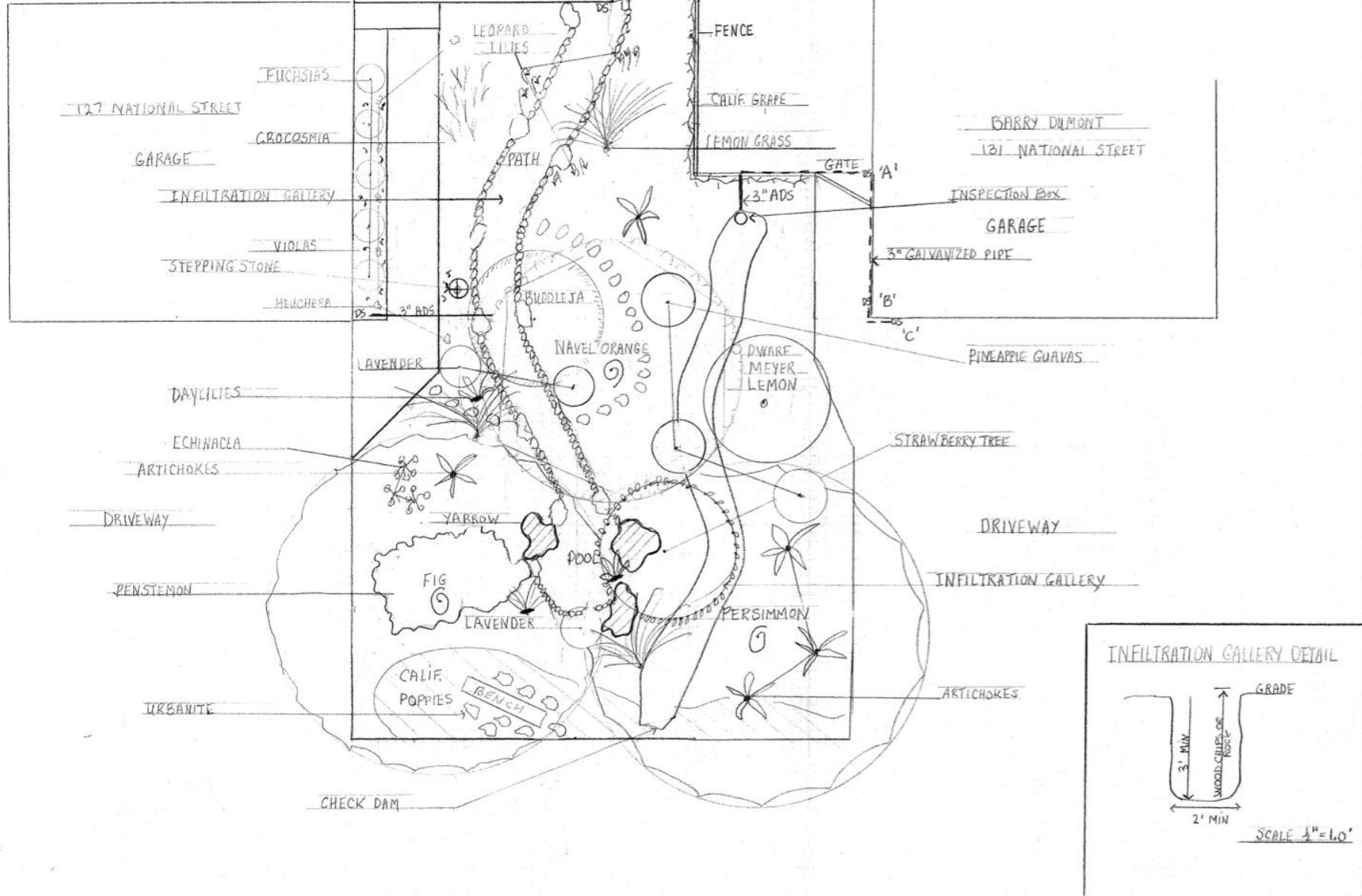
- ✖ We will know next year
- ✖ Owners are water managers

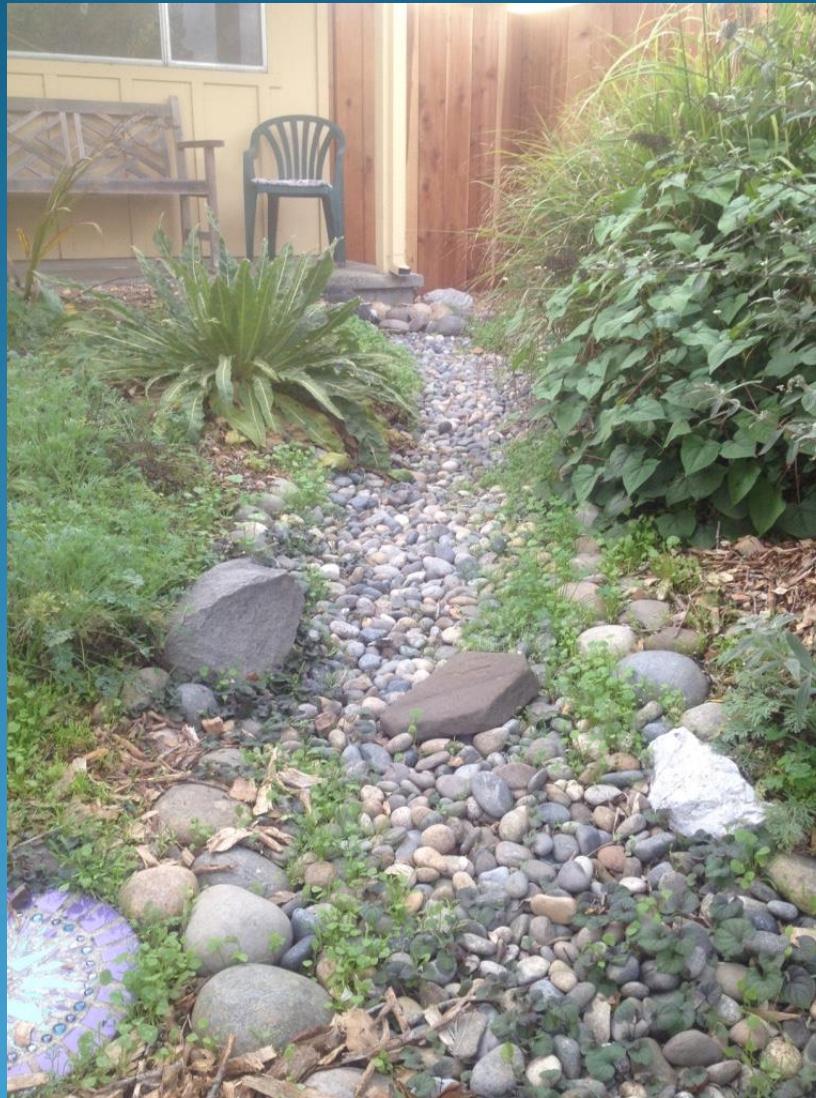
# Challenges/Learning

- ✖ Still learning the basics of co-creation
- ✖ Use a pre-filtration filter that can handle surges better



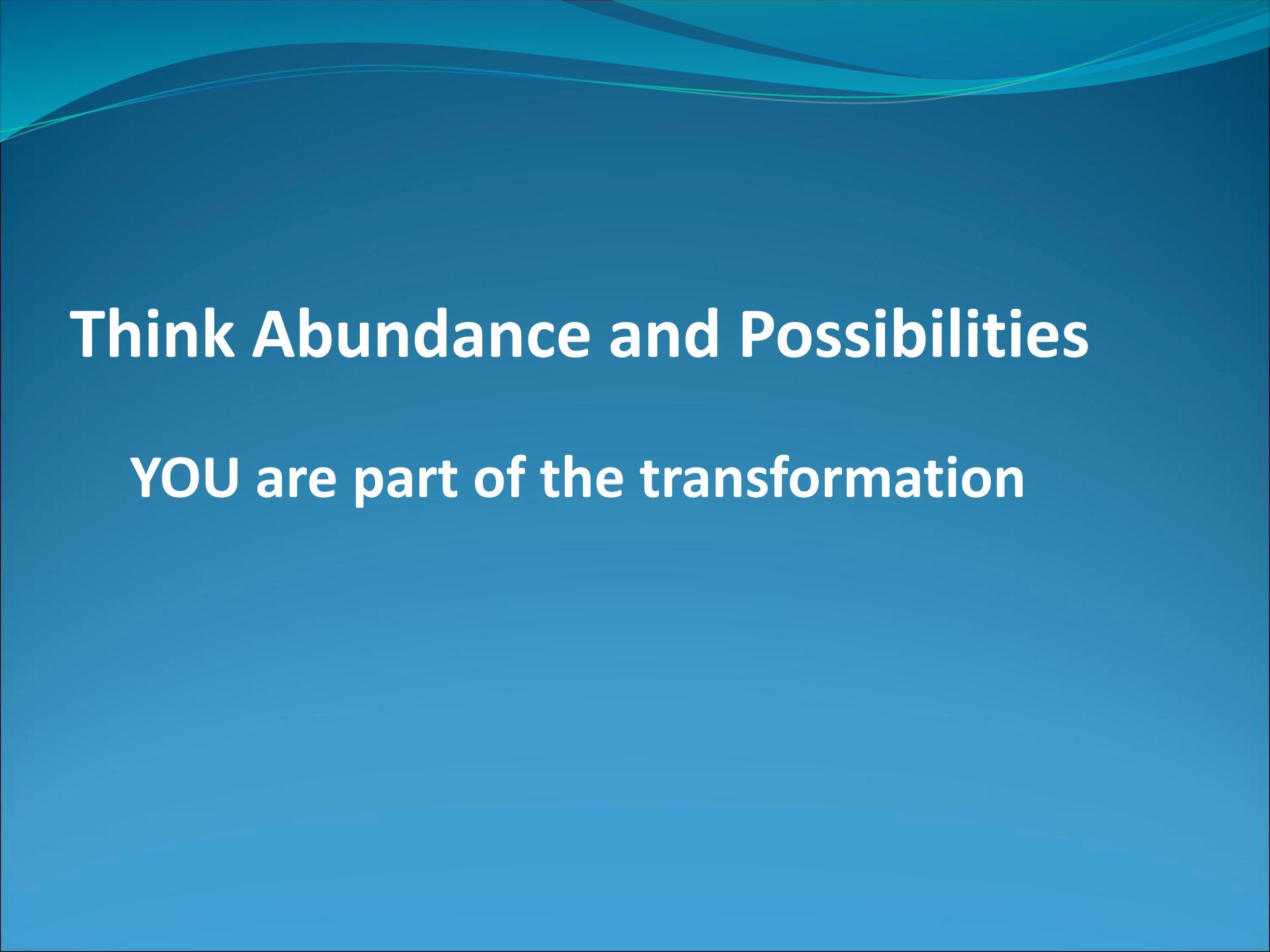
**100% Water Neutral**





# Costs: 127 National St. Infiltration Gallery

- ✖ Rock—used on-site material (free)
- ✖ Piping—5' scrap left over from job (free)
- ✖ Downspout adapter \$3.99
- ✖ Elbow \$5.89
- ✖ **TOTAL COST \$9.99**



Think Abundance and Possibilities

YOU are part of the transformation

# Need more information?

- ✖ [websoilsurvey.nrcs.usda.gov](http://websoilsurvey.nrcs.usda.gov)
- ✖ [HarvestingRainwater.com](http://HarvestingRainwater.com)
- ✖ [arsca.org](http://arsca.org) (water harvesting info)
- ✖ [rcdsantacruz.org](http://rcdsantacruz.org) (for free drainage manual)
- ✖ [oasisdesign.net](http://oasisdesign.net)
- ✖ [lovesgardens.com](http://lovesgardens.com)
- ✖ [goldenlove@lovesgardens.com](mailto:goldenlove@lovesgardens.com)
- ✖ Golden Love (831) 471-9100

# CASE STUDIES

Questions and Answers

# Small Group Work Session

## Landscape Scenarios

# End of Summit

- 1) Thank you so much for attending!
- 2) Keep an eye out for our follow up emails in the coming weeks.
- 3) Please turn in your Feedback Forms

