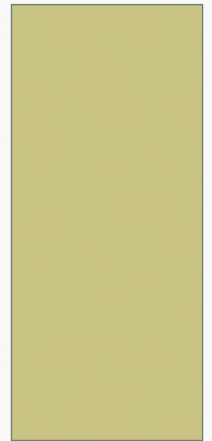


2012 HIGHER EDUCATION  
SUSTAINABILITY CONFERENCE  
WATER EFFICIENCY AND SITE WATER QUALITY

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# PRESENTATION OVERVIEW

- Cal Poly Campus Overview
- Cal Poly Water Resources
- Evapotranspiration (ET) Irrigation Control System
- Sports Complex Artificial Turf
- Poly Canyon Village Restoration
- Agriculture Water and Waste Management
- Landfill/Mining Pit Restoration

# CAMPUS OVERVIEW

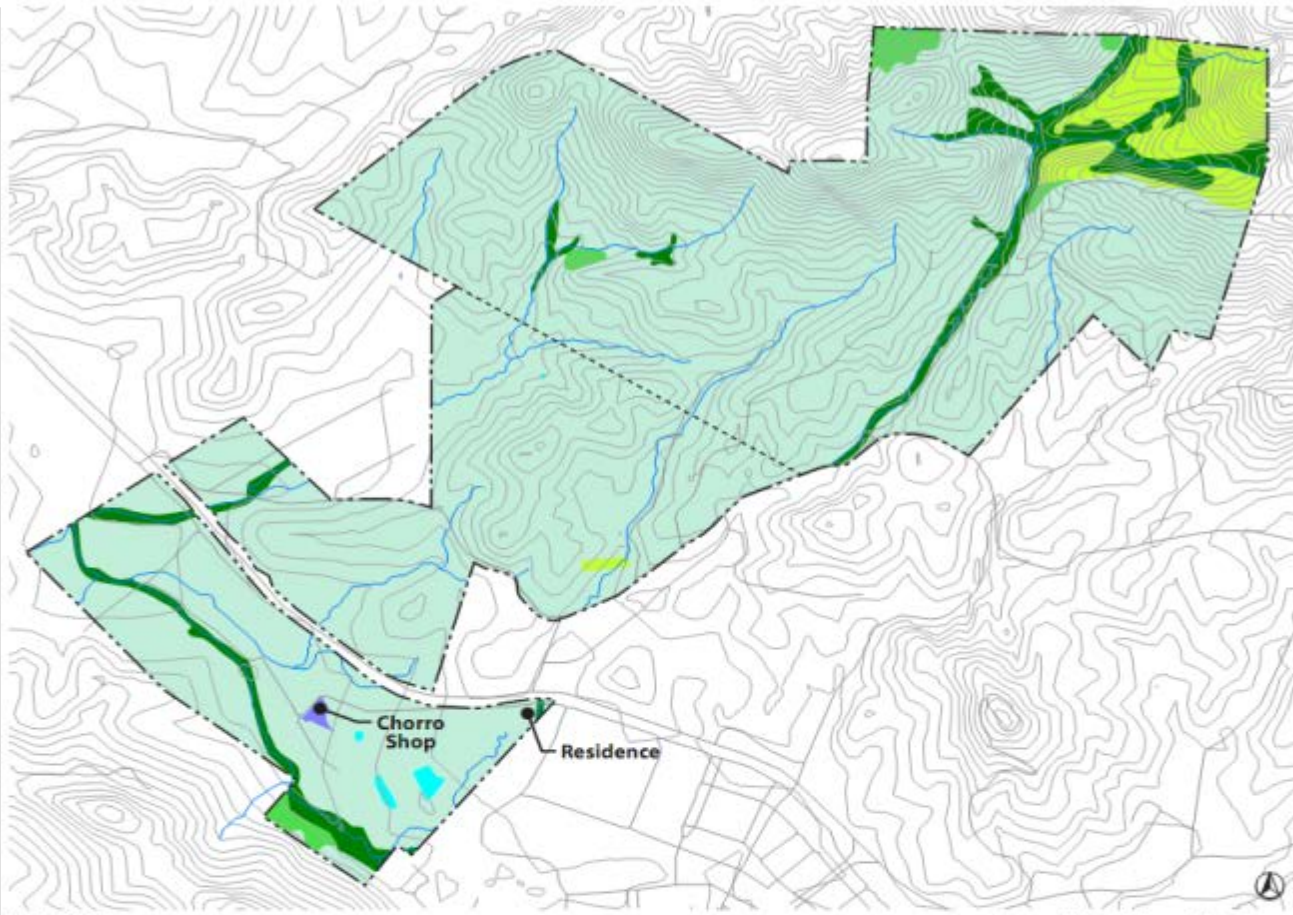
- Land Holdings
  - Campus Core = 155 acres
  - Extended Campus = 1,666 acres
  - SLO Creek Ranches = 1,614 acres
  - Chorro Creek Ranches = 3043 acres
  - Swanton Pacific Ranch (Santa Cruz County)
    - 3,200 acres



**LEGEND**

- Campus Instructional Core
- Residential Communities
- Public Facilities and Utilities
- Areas Suitable for Ancillary Activities and Facilities
- CDF Lease Property
- Parking (surface & structure)
- Remote Parking Options

- LAND USE** | EXHIBIT 1  
 San Luis Obispo Creek Watershed
- Outdoor Teaching and Learning  
Includes:
  - Recreation, Athletics and Physical Education
  - Natural Environment
  - Preserves



Not To Scale

**LAND USE MAP** | EXHIBIT II  
Chorro Creek Watershed

**LEGEND**

- Existing Agriculture Facilities
- Outdoor Teaching and Learning
- Roadways

**Environmentally Sensitive Areas**

- Biologically Sensitive Areas
- Preserves (Biological, Archeological)
- Significant Riparian Areas
- Reservoirs

# WATER RESOURCES

- 57 miles of drainages
- 7 miles of perennial streams
- 10 reservoirs
- 7 wastewater ponds
- 100 isolated areas with wetland characteristics
- Springs, wells and water storage facilities
- 3 potable water storage reservoirs (1.5M cap)
- Whale Rock Reservoir (13,500 acre-feet)

# ET (EVAPOTRANSPIRATION) BASED IRRIGATION CONTROL SYSTEM

- 32 acres
  - Spanos Stadium
  - Track Fields
  - Sports Complex
- Reduction 20-30% water use
  - 6 acre-feet potable (\$14,000/year)
  - 14 acre-feet non-potable (\$300/year)

# RAINMASTER EVOLUTION DX2 ET CONTROL STATION

- OASIS Software
- Automatically adjusts irrigation rates based on ET rates
- Reduces maintenance labor
  - Inspection & adjustment
  - Instantaneous notification of system malfunction





# SPORTS COMPLEX ARTIFICIAL TURF

- July 2009
- 5.7 acres replaced with artificial turf
- Goals
  - Conserving water
  - Reduced maintenance
  - Increased playability during rainy season

# SPORTS COMPLEX ARTIFICIAL TURF

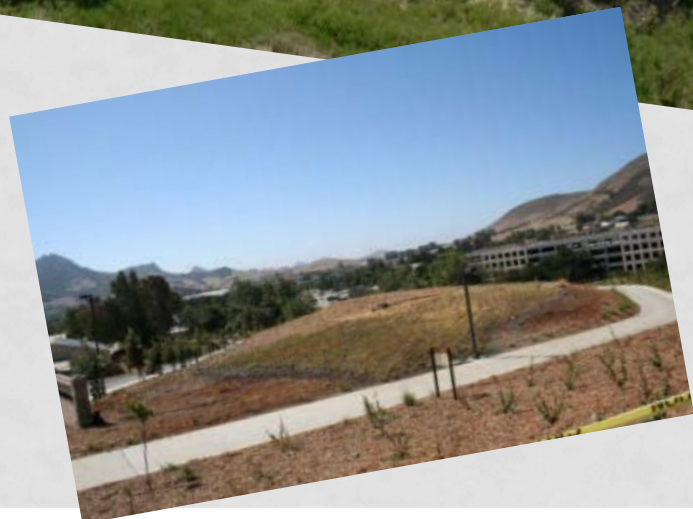
- Artificial Turf
  - Monofilament fiber system
    - crumb rubber infill,
    - brock underlayment,
    - sand bedding and
    - porous aggregate sub-base
  - Perforated drainage system
- Permanent striping
























# POLY CANYON VILLAGE RESTORATION

- 2700 on-campus housing beds (30 acres)
- 4 acre site
- 12,000 native species planted
- Temporarily drip irrigated
- 100+ cubic yards of mulch





# PLANTING

Symbol	Binomial Name & Common Name	Quantity	Size
	<i>Ceanothus</i> 'Joyce Coulter' California Lilac	116	5 gallon 10ft O.C
	<i>Trichostema lanatum</i> Woolly Blue Curls	57	1 gallon 4ft O.C.
	<i>Verbena Lilacina</i> Lilac Verbena	96	1 gallon 4ft O.C.
	<i>Salvia bee's Bliss</i> Bee's Bliss Sage	115	1 gallon 8ft O.C.
	<i>Muhlenbergia rigens</i> Deer Grass	279	1 gallon 5ft O.C.
	<i>Salvia sonomensis</i> Dara's Choice	253	1 gallon 5ft O.C.
	<i>Penstemon heterophyllus</i> Margarita Bop	87	1 gallon 3ft O.C.
	<i>Mimulus Aurantiacus</i> Orange Bush Monkey Flower	142	1 gallon 4ft O.C.
	<i>Sambucus mexicana</i> Western Elderberry	5	15 gallon 18ft O.C.
	<i>Quercus suber</i> Cork Oak	3	15 gallon 40ft O.C.
	<i>Aesculus Californica</i> California Buckeye	14	15 gallon 18ft O.C.
	<i>Quercus Agrifolia</i> California Coast Live Oak	13	15 gallon 36ft O.C.
	<i>Fremontodendron californicum</i> CA Flannelbush	422	5 gallon 12ft O.C.
	<i>Rhus ovata</i> Sugar Bush	1098	5 gallon 12ft O.C.
	<i>Baccharis pillularis</i> Coyote Brush	29	1 gallon 6ft O.C.
	<i>Cercis occidentalis</i> Western Redbud	48	15 gallon 9ft O.C.
	<i>Arctostaphylos</i> Monterey Carpet	5830	1 gallon 6ft O.C.
	<i>Romneya coulteri</i> Matilija Poppy	9	1 gallon 8ft O.C.
	<i>Achillea Millefolium</i> Yarrow	110	1 gallon 2ft O.C.
	<i>Artemisia Californica</i> California Sagebrush	77	1 gallon 5ft O.C.
	<i>Bouteloua Species</i> Grama grass	3480	1 gallon 1.5ft O.C.

# AGRICULTURE WATER AND WASTE MANAGEMENT

- Discharge of animal waste
  - 40 acre-feet storage from 2009-10 rain year
- Improvement in Discharge
- Reservoir Level Balance
- Compost
  - Animal Bedding
  - Utilized on campus landscape and in fields and pastures
  - March 2012 – begin bagging compost from animal manure
  - Since Mid-April 2012 – sold 500 bags (1.5 cubic-feet or 50 lbs)

# DAIRY WASTEWATER

- 240 Dairy Cows
- Solid Separation
- 30,000 gallons/day in washwater
  - 34 acre-feet/year
- Sprayfield Discharge
  - WDRs under RWQCB permit



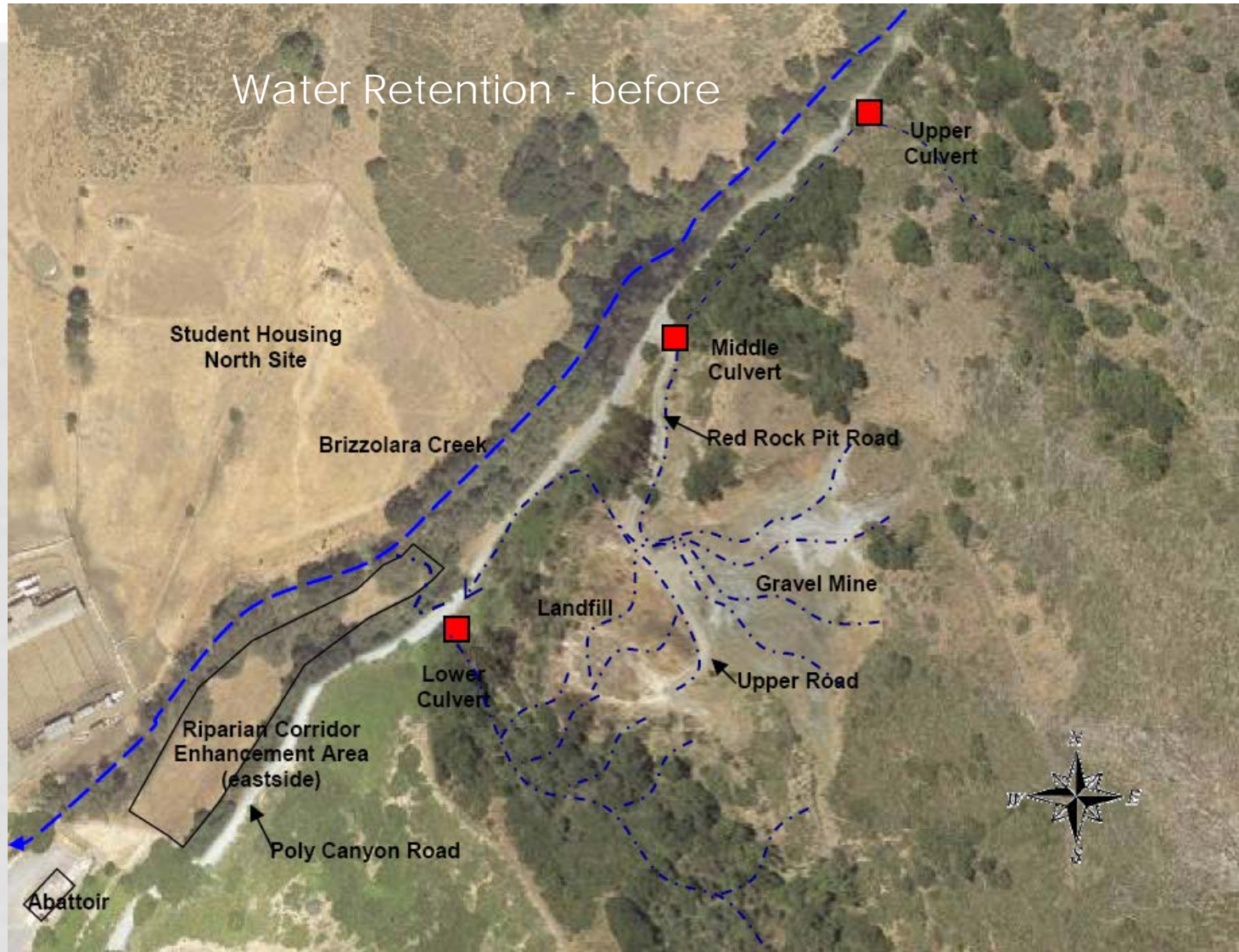
# AG IRRIGATION MANAGEMENT

- Irrigation Management Study
- Upgrades to existing Wells
  - Replaced with variable frequency drive, allows water pressure to increase/decrease gradually
- Well Flow Meters
  - 8 meters installed
  - Regular monitoring and metering of electricity
- Rain Catchment
  - Complete 2013
  - Reduce groundwater withdrawals

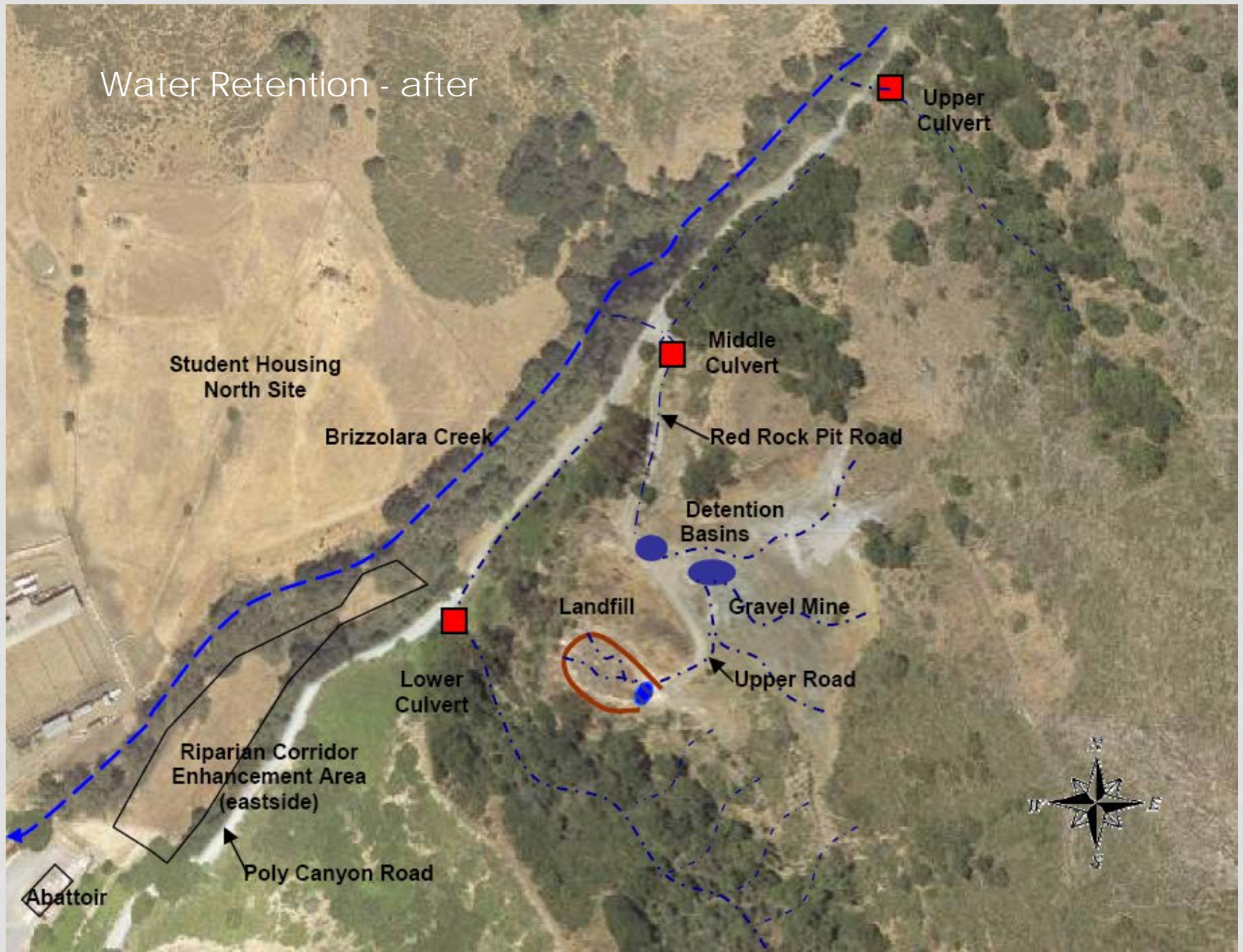




# LANDFILL/MINING STORMWATER CONTROLS



# Water Retention - after



# DETENTION BASINS



Figure 23: Overview of detention basins  
Apr 05



Figure 24: Overview of detention basins  
Oct 06

# STRAW WATTLES



# CURTAIN DRAIN



# RIPARIAN ENHANCEMENT



# RIPARIAN ENHANCEMENT



- Riparian Habitat Improvement
- 200 container plants
- 1000 ft of riparian fencing replaced
- On-going projects
  - Competing weeds
  - Animal management

# GENERAL

- No increase in indoor water usage since 2004/05 – including addition of 2,700 beds of on-campus housing
- Reduction of campus core irrigation water use by 14% since 2009
- Reduction of Agricultural water use by 20% since 2009



# COSTS

- ET Irrigation Control System – \$12,000
- Sports Complex Artificial Turf – \$4 million
- Poly Canyon Village Restoration - \$265,000
- Agriculture Irrigation Upgrades - \$175,000
- Improvements to wells, springs & reservoirs - \$175,000
- Riparian Enhancement Project - \$222,000 (\$130,000 SWRCB 319(h) Grant)

# REDUCTIONS

- Potable Irrigation Water – 14% reduction
  - 45 acre feet/year (15 MILLION gallons)
- Non-potable Water – 20% reduction
  - 130 acre feet/year (42 MILLION gallons)
- Improved Stormwater
  - 20 acre feet/year (6.5 MILLION gallons)
- Reclaimed/Recycled Water (Dairy)
  - 34 acre feet/year (11 MILLION gallons)
- Reclaimed Water – Sprayfields
  - 40 acre feet/year (13 MILLION gallons)

# SAVINGS

- Potable Water Savings (Irrigation)
    - \$107,000/year (at \$5,44/hcf)
  - Non-Potable Water Savings (Irrigation)
    - \$2,800/year (at \$0.05/hcf)
  - Non-Potable Water Savings (Recycled)
    - \$1,600/year (at \$0.05/hcf)
  - TOTAL Savings \$111,400
- hcf = hundred cubic feet (748.05 gallons)

# QUESTIONS?

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