



# Planning for Our Water Future:

## City of Santa Cruz & Soquel Creek Water District

Sustainable Water Coalition

September 19, 2011



# Overview

- 💧 **Background information on City of Santa Cruz and Soquel Creek Water District**
- 💧 **Our Water Supply Problems**
- 💧 **Our Water Plans**
- 💧 **Progress & Updates to our Water Plans**
- 💧 **scwd<sup>2</sup> Desalination Program- Timeline**
- 💧 **Frequently Asked Questions**



## **Our Primary Goals Regarding Water Supply:**

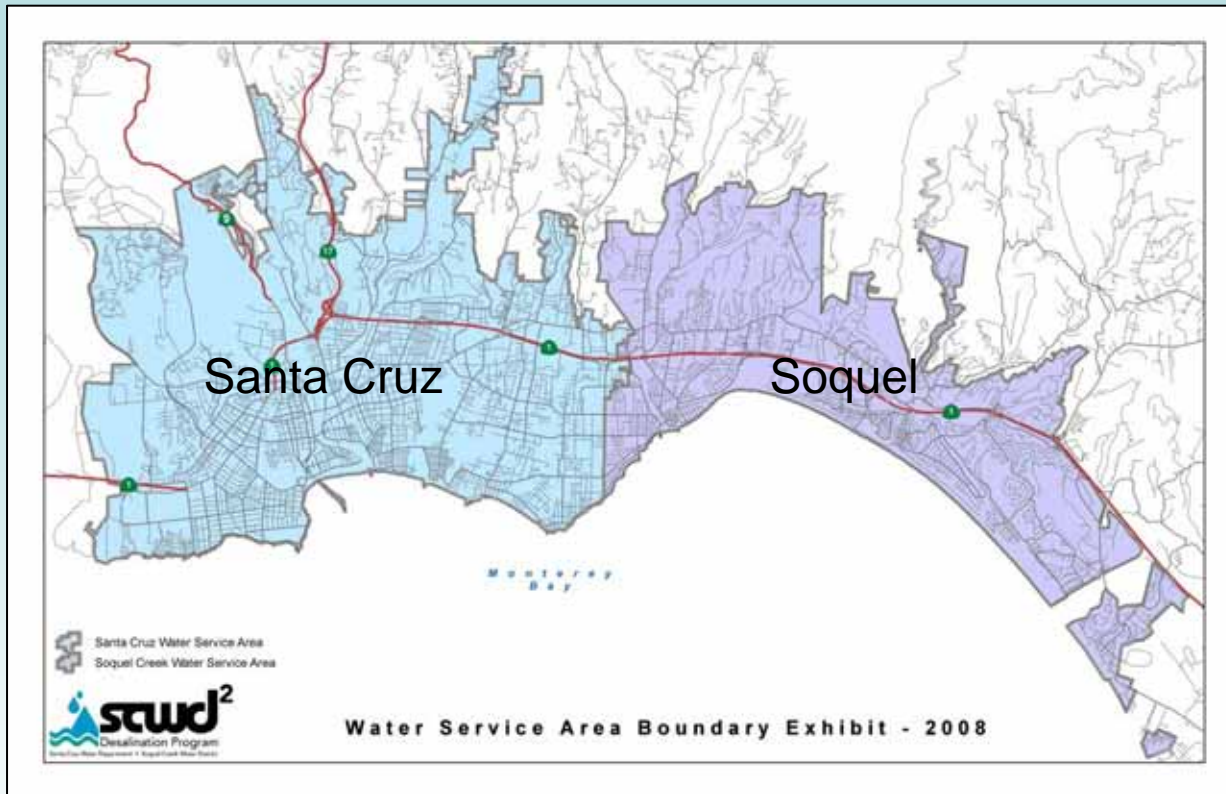
Safe ● Adequate ● Reliable

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## **The Challenge Every Water Utility Faces:**

How to best balance available water supplies with the needs/demands of utility customers, now and into the future.

# scwd<sup>2</sup> is a collaboration between the Santa Cruz Water Dept. & Soquel Creek Water Dist.



- ◆ Together we serve over 135,000 people
- ◆ Similar values and objectives
- ◆ Our different needs led us to a collaborative approach for sustainable water resources

# Demographics



- Population: ~91,000
- Employment: ~45,000
- 63% residential, 26% business, industry, UCSC
- Indoor use 75-80%, Outdoor use 20-25%

- Population: ~38,000
- Employment: not available
- 79% residential, 13% commercial, remainder is irrigation and other
- Indoor use 75%, Outdoor use 25%

# Our Water Supplies: 100% Local Supply- No water is imported



## City of Santa Cruz

- Water primarily comes from rainfall into local streams and reservoirs
- Small portion of the system is groundwater

## Soquel Creek Water District:

- Local groundwater is the only source
- No water from creeks or rivers







# Water Supply Issues

## 1. Shortage during drought conditions

Approximately 40% shortfall if drought similar to 1976-77 occurs

## 2. Safe stream flow passage

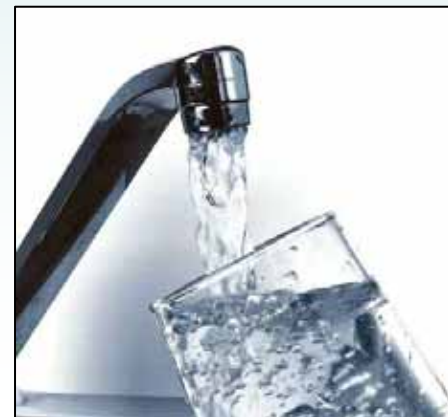
New regulatory requirements to protect endangered fish species (Habitat Conservation Plan)

## 3. Water rights

Pending applications could affect reservoir operations and reduce water withdrawals

## 4. Water quality

Groundwater basin is overdrafted





SOQUEL CREEK  
WATER DISTRICT

## Water Supply Issues

### 1. Groundwater Overdraft

Sustainable yield could be as much as 40% less than what was previously assumed

### 2. Seawater Intrusion

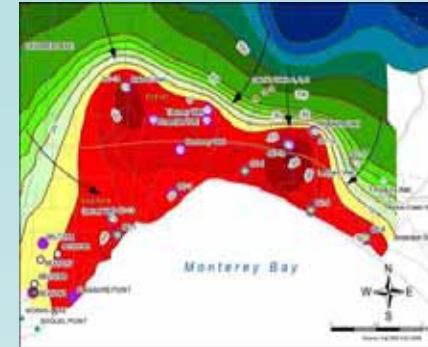
Contamination by seawater into the freshwater aquifers will make the groundwater unusable

### 3. Water Quality

New drinking water regulations for Cr 6 could impact 1/3 of our groundwater supply

### 4. Climate Change

Potential for intense storms with greater runoff and less percolation into the aquifers, more frequent droughts, and rising sea levels





# No Supplemental Supply? What could happen....

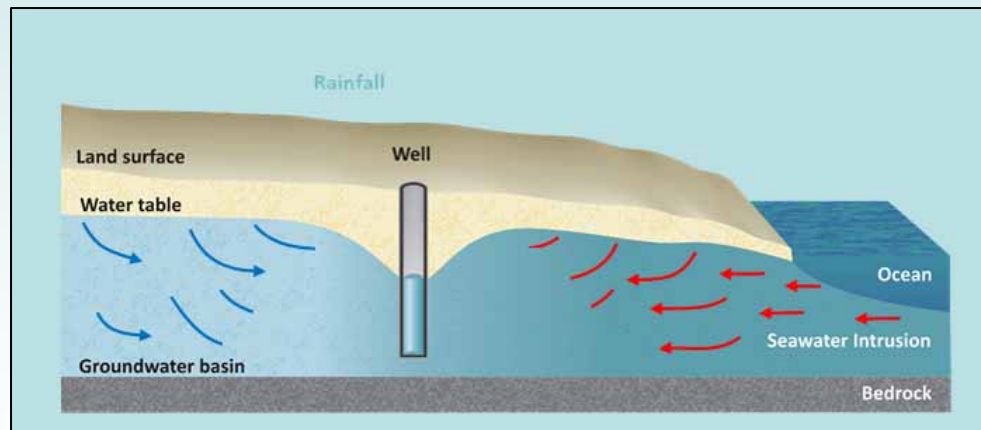


## City of Santa Cruz (during drought conditions)

- Severe water rationing
- Extreme limits on outdoor use
- Recreation facilities (parks, pools) reduced or shut down
- Affects residents, businesses, tourism, etc.

## Soquel Creek Water District

- Severe water rationing
- Contamination of our only water supply
- Damage can be irreversible
- Affects residents, businesses, tourism, etc.



# SCWD and SqCWD have spent over 30 years studying and investigating a supplemental water supply.

**Water Supply Planning** for City of Santa Cruz Water Department

**Recent History of Water Supply Planning Studies**

The City of Santa Cruz has been actively pursuing a supplemental source of water supply since the mid 1960s, when it initiated several adjoining ground water systems and installed planning of a central water treatment plant. The following is a brief chronology of water supply planning studies conducted since the mid 1960s. These have led up to the current planning project currently underway.

- Water conservation and leak control programs
- Development of treaties between the water distribution systems of various agencies
- Zapata Creek Dam
- Development of additional ground water supplies for Santa Valley/San Lorenzo Valley
- Western City of Santa Cruz capital improvement program elements (Madison Creek off stream storage reservoir, a pump station at Madras Creek diversion, and new ground water wells)
- Groundwater

**1965-1969**  
In June 1965, a Joint Powers Authority representing the water agencies and local area agencies in North Santa Cruz County prepared the North Santa Cruz County Water Master Plan (NSCCWMP). The Water Master Plan also proposed to augment supply but also proposed some City only alternatives. The report made no specific recommendations but indicated the following alternatives be considered:

**1965-1969**  
In June 1965, a Joint Powers Authority representing the water agencies and local area agencies in North Santa Cruz County prepared the North Santa Cruz County Water Master Plan (NSCCWMP). The Water Master Plan also proposed to augment supply but also proposed some City only alternatives. The report made no specific recommendations but indicated the following alternatives be considered:

**Partial List of Water Management Studies**

- The Water Master Plan Study, completed in 1967 by AEC and SEA
- The Water Diversion Investigation, completed in 1968 by Madras Water Management
- The Water Conservation Plan, completed in 2003 by Clay Roberts Associates
- The Water Control Study, completed in 2003 by Clay Roberts Associates
- The Alternative Water Supply Study, completed in 2002 by Clay Roberts Associates
- The Long-term Water Plan, completed in 2002 by Clay Roberts Associates
- The Urban Water Management Plan, completed in 2008 by the City of Santa Cruz

**Fast Facts for City of Santa Cruz**

**Western State Improved Water:** No

**Source of Water:** 95% surface water. The City's sources of surface water include the San Lorenzo River, Madras Creek, Madras Creek, Lodi Spring and Madras Creek and Lodi Spring Reservoir. 5% groundwater. The City obtains its groundwater from its Lodi Spring Reservoir.

**Service Area:** The City's Water Department service area includes the City itself, portions of incorporated Santa Cruz County and 2 small portions of the City of Capitola.

**Approximate Population Served:** 60,000-100,000

**Approximate Percentage of Water Use by Customer Type:**

- 42% Single-Family Residential
- 21% Multi-Family Residential
- 21% Commercial, Industrial and Institutional
- 16% Discretionary Irrigation

**Average Annual Water Production:** 2.6 billion gallons (at 11,000 acre-feet)

**Number of Miles of Pipeline:** Approximately 200 miles

**Water Supply Planning** for Sequoia Creek Water District

**Past, Present and Future: Managing Water Supply & Demand**

**Early History: Late 1950's to mid 1960's**  
In 1956, after the devastating flood of 1955, Sequoia Creek County Water District (changed to Sequoia Creek Water District in 1962) was formed with the well water from a proposed Army Corps of Engineers dam and reservoir project that was to be built on Sequoia Creek. The dam received strong community opposition and was never constructed, and the District began to focus on the existing groundwater supply as a second toward acquiring small local water systems such as the Monterey Bay Water Company.

In the mid 1960s, the District operated an separate groundwater system stretching from Capitola to La Selva Beach, but little was known at that time about the groundwater basin underlying the District's service area. With development occurring in the mid-coast area, the District and the City of Santa Cruz contracted with the United States Geological Survey (USGS) to prepare a comprehensive geophysical report of the groundwater basin as they could gain an understanding of the hydrogeology of the Sequoia-Agria area.

In 1967, the USGS report, written by John J. Hickey, identified the Sequoia-Agria basin as two separate aquifer systems: the Pucheta Formation and the Agria. Hickey's report estimated that 71% of the basin (47% of the basin) was covered by the Agria system, and 28% of the basin was covered by the Pucheta Formation.

Assessing the possibility for managing and protecting the groundwater resources and knowing the changing raw water supply takes many years. The District's environmental impact study on the feasibility of building a dam on the west branch of Sequoia Creek (also known as the Glenwood Dam) in 1970.

**Fast Facts for Sequoia Creek Water District**

**Western State Improved Water:** No

**Source of Water:** 100% groundwater. The District obtains its groundwater from 14 production wells located in the Sequoia-Agria Basin.

**Service Area:** The District's service area includes Capitola, most of the City of Capitola, Agria, Rio Del Mar, Seaside and La Selva Beach.

**Approximate Population Served:** 50,000

**Approximate Percentage of Water Use by Customer Type:**

- 42% Single-Family Residential
- 16% Multi-Family Residential
- 16% Commercial, Industrial and Institutional
- 26% Discretionary Irrigation

**Average Annual Water Production (2010-2019):** 4.875 acre-feet per 1.37 billion gallons

**Number of Miles of Pipeline:** Approximately 120 miles

**Partial List of Water Management Studies**

- Draft Long-term Resource Plan (draft 2007, 1999)
- Executive Order Regional Supply Alternatives, 2002
- Executive Order Assessment of Alternatives, 2002
- Comprehensive Assessment of Alternatives, 2002
- Comprehensive Assessment of Alternatives, 2002
- The Sequoia Creek Water District Urban Water Management Plan Update, 2005
- Sequoia Creek Water District Long-term Resource Plan (2007), update of 1993 draft 1992, 2006
- Comprehensive Assessment Plan - 2007 for Sequoia-Agria Area, 2007

- Fact Sheets focus on the History of Water Planning
- Includes a timeline of various studies
- Includes a shortlist of previous projects considered

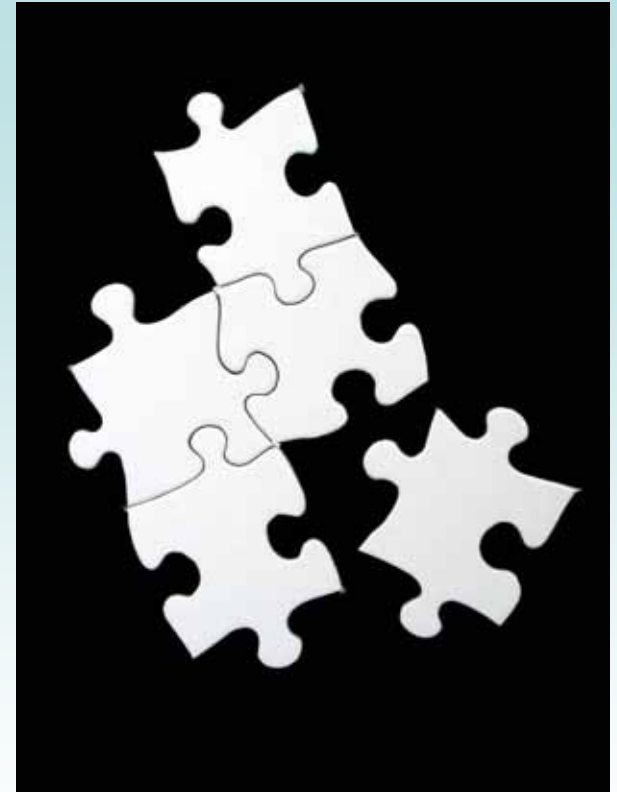
# **Solution not just a single supply project. In the late 1990's- both agencies pursued Programmatic Approach**

## **Programmatic Approach**

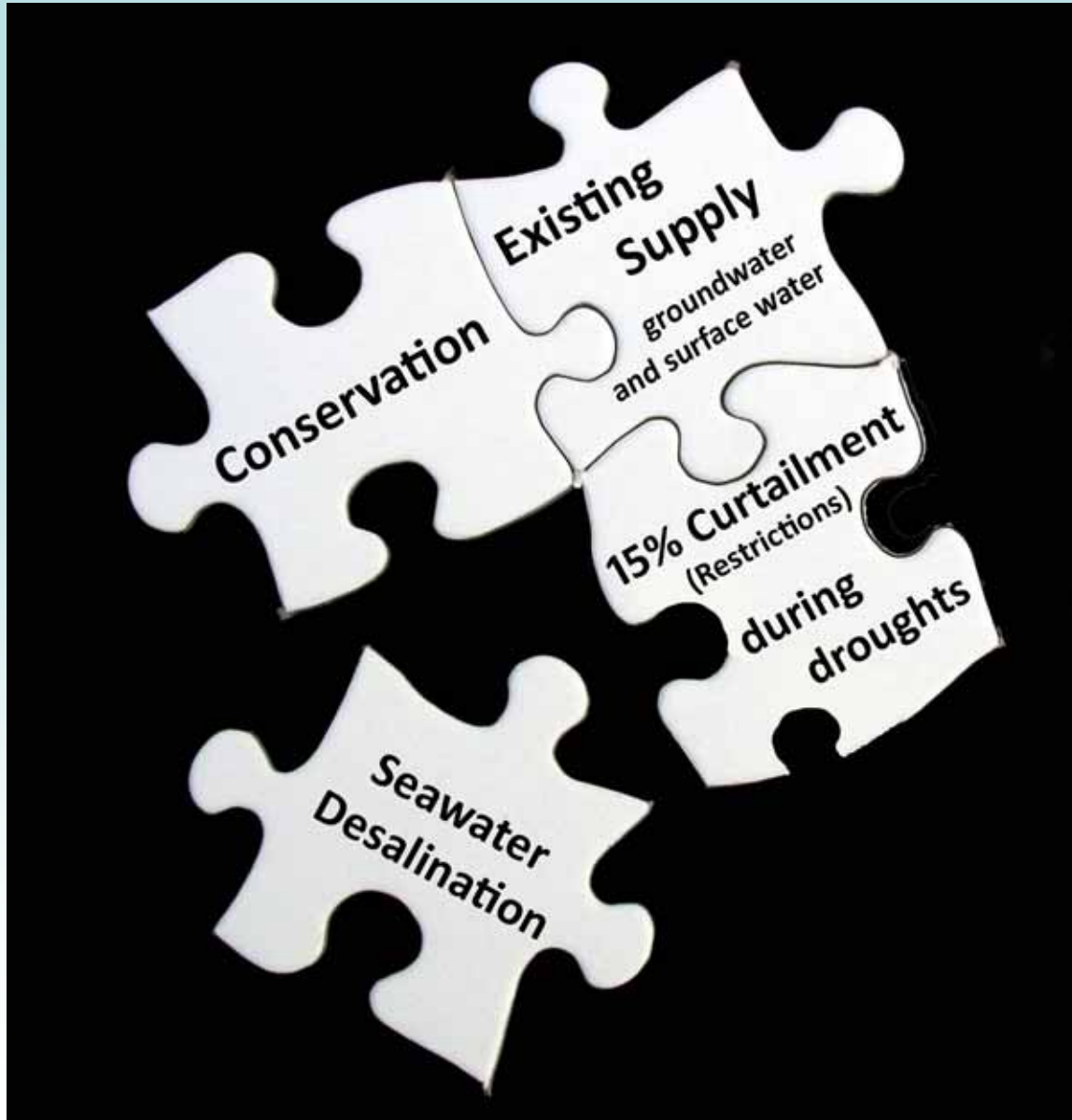
Decrease demand and increase supply

## **Additional Studies and Reports**

- ◆ SqCWD Draft IRP (1997)
- ◆ Water Demand Investigation (1998)
- ◆ Water Conservation Plan (2000)
- ◆ Water Curtailment Study (2001)
- ◆ Alternative Water Supply Study(2000)
- ◆ Evaluation of Regional Water Supply Alternatives (2002)
- ◆ SCWD Integrated Water Plan (2003)
- ◆ 2005- Program IWP EIR (2005)
- ◆ 2006- SqCWD IRP (2006)



# Our Water Plan



# Santa Cruz and Soquel Creek have active ongoing Conservation Programs to reduce water demand



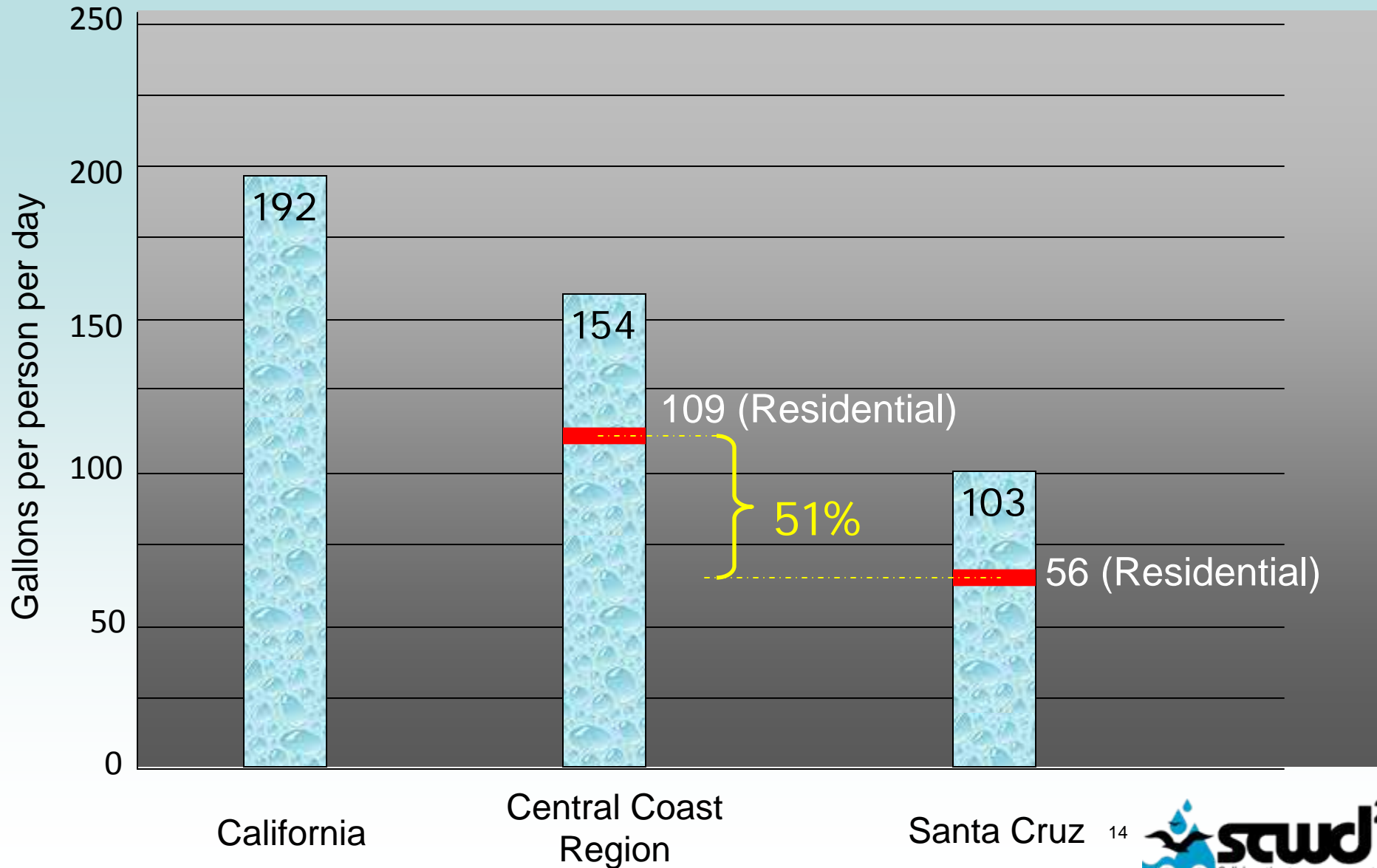
## Partial List:

- Home water surveys
- Toilet rebates
- Clothes washer rebates
- Turf replacement
- Rainwater cisterns
- Plumbing fixture retrofit ordinances
- Tiered rate structures

**Both agencies have been recognized for award-winning Conservation Programs**



# Current Water Use Comparisons and Results of Conservation Efforts





## In a drought, 15% additional rationing and restrictions are needed



### For City, likely drought scenario (Stage 3) includes:

- 💧 Restricted residential water use (27%)
- 💧 Minor cutbacks to businesses (8-10%)
- 💧 Reduced large landscape water budgets (66% reduction)

**Our customers already do a great job conserving -  
With rationing, mandatory use restrictions would be in effect.**

# Conceptual 2.5 MGD Desalination Facility



\* Shared Use

\* Shared Costs

# Passive wedgewire screens at an open ocean intake are designed to protect marine organisms

Potential intake system under evaluation:



Courtesy of: Alden Research

**Slot size of 2 mm**

**Intake velocity < 0.33 fps**



# Why Desalination?



- ◆ Technology is safe and used worldwide to provide potable water
- ◆ One desalination facility would meet the needs for both agencies at a shared cost
- ◆ Diversifies our water portfolios
- ◆ The ocean is a viable supplement to surface and groundwater sources that are vulnerable to drought and seawater contamination
- ◆ A desalination facility is a flexible supply project. Can be responsive to growth, but not out ahead of growth.

# Sharing 2.5 MGD of Desalinated Water



- Would use up to 2.5 million gallons per day (May-October)
- Operate during droughts, approx. 1 or 2 in 7 years
- Potentially use 3 in 10 years for HCP.



- May use ~1.5 million gallons per day (year round)
- (1) Operate to restore groundwater basin (could take 10+ years) then (2) at a lesser amount to sustain protective groundwater levels

# Water Supply Planning: Engineering, Science and Policy



**CEQA**





# Key Changes for SCWD since 2005 IWP



- ◆ Updated Water Demand and Forecast (2010 UWMP)
- ◆ Updated Stream Flow Data
- ◆ Decline of Available Groundwater Supply
- ◆ Development of Habitat Conservation Plan

## Conclusion

- ◆ Under a '76-'77 type drought, peak season shortages still look much like they did in the original IWP work (around 40% near term and exceeding 50% long term) with additional HCP Requirements (Tier 2)

# Key Changes for SqCWD since 2006 IRP

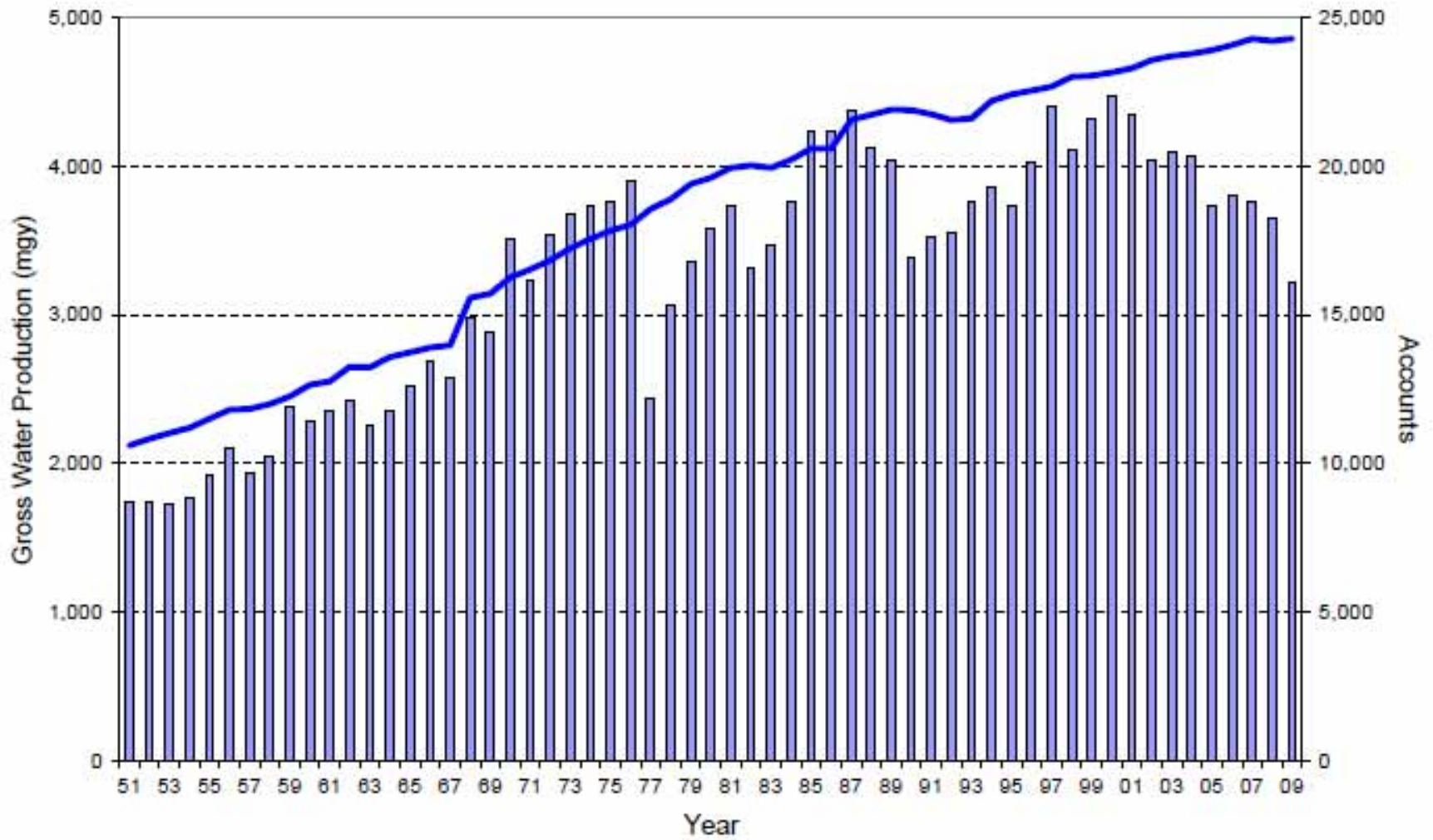


- Updated Water Demand and Forecast (2010 UWMP)
- New information on Groundwater Supply, especially Aromas Red Sands Aquifer
- Drinking water regulations on Cr 6

## Conclusion

- Initial restoration of the groundwater basin may require limiting pumping by as much as 40% (from 4,800 afy to 3,000 afy) and could take 10 years to see recovery.
- Even with additional 15% cumulative water conservation projections through 2030, a supplemental supply is still needed to meet customers' needs.

## City of Santa Cruz Water Service Accounts And Water Production



# Overall scwd<sup>2</sup> Proposed Project Schedule and Timeline

**2005 - 2010** Pilot Plant Testing



**2008 - 2012** Additional Studies & Environmental Impact Report



**2010 - 2012** Design and Permitting



**2013 - 2016** Construction

(Schedule subject to change)

# How to stay informed about the project

- ◆ Handouts are available at back table
- ◆ E-mail Updates – sign up to receive monthly email notices and project updates
- ◆ For more info contact: Desalination Program Coordinator at (831) 420-5214

Visit our website:  
**[www.scwd2desal.org](http://www.scwd2desal.org)**

**Questions?**

# Frequently Asked Questions



What studies have been conducted?

Does desalination use a lot of energy?

How are the agencies addressing greenhouse gas emissions?

What about a surface water transfer?

Are there successful desalination plants currently in operation?




How much will the proposed project cost?





## *What studies have been conducted? What are the preliminary results?*

**Numerous technical studies are providing the data that substantiates that desalination is plausible**

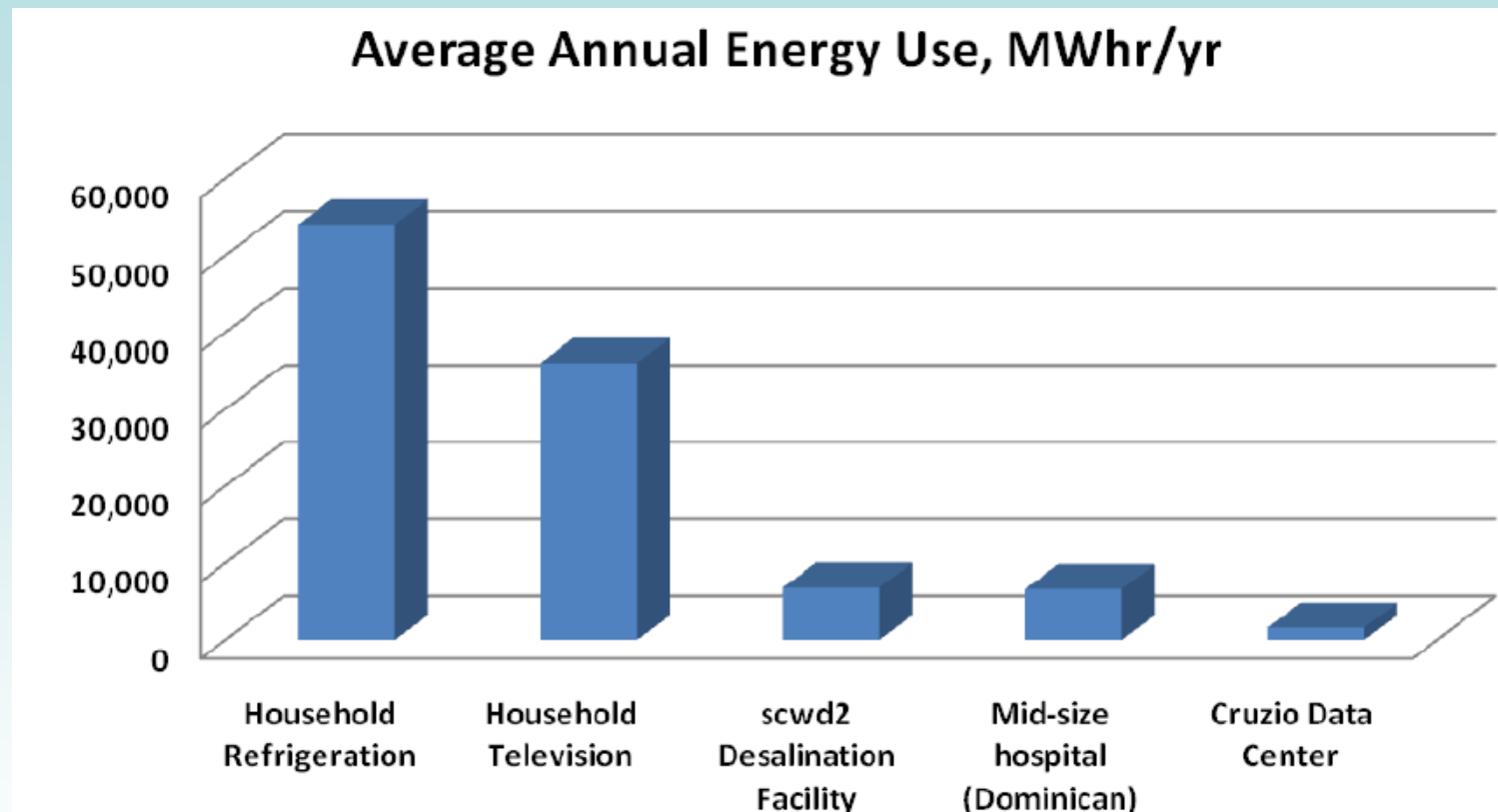
<u>Concern</u>	<u>Study</u>	<u>Study Findings</u>	
Water Quality	Pilot Plant Testing	Desal water is safe	
Marine Impacts with Intake	Open Ocean Effects (Entrainment and screen effectiveness)	No endangered or threatened species found, entrainment impacts considered de minimus	
Marine Impacts with Brine Discharge	Brine Dilution Study	Can effectively blend treated wastewater and brine.	
Energy and GHGs	Energy Minimization & GHG Reduction Plan	<i>Currently underway</i>	

**Technical studies will be used to fully inform the environmental impact report (EIR).**



## *Will the proposed desalination project use a lot of energy?*

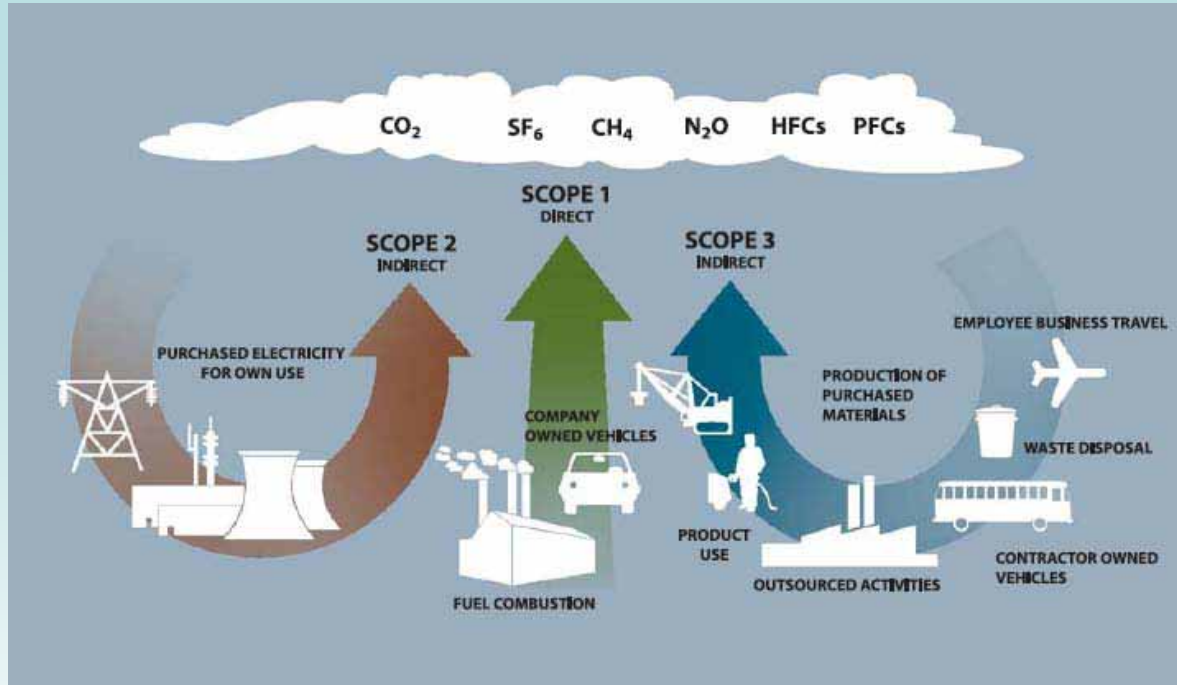
**Energy to operate desal plant is less than 20% of energy used for TVs in our service areas**



**On a household basis, the additional energy for desal is equivalent to leaving a computer on for 1-3 hours a day.** <sup>27</sup>



# How are the agencies addressing greenhouse gas emissions?



**An Energy Minimization and GHG Reduction Plan is underway with a Technical Working Group to evaluate ways to reduce the carbon footprint, including net-carbon neutral.**

- Desalination uses electricity so it indirectly causes GHG emissions in the same manner as homes and businesses
- The additional indirect GHGs to operate the desal plant is equivalent to approx. 400-700 typical automobiles.



## What about the surface water transfer project?



SCWD and SqCWD support the County's continued evaluation of surface water transfers... but project does not meet either agency's near-term needs.

- Estimated ~340 afy available to SqCWD. This is less than 25% of the supplemental supply needed.
- SCWD is not guaranteed any water back from SqCWD or SV because both groundwater basins are overdrafted.
- “..... **not considered an alternative** to developing a new reliable and flexible supplemental supply.”

- John Ricker, Water Resource Division Director  
Santa Cruz County Environmental Health Services



# Desalination is a proven and successful technology



*Sand City's RO units*

- 1950s - First major desalination plants built in the Middle East
- 1961 - First U.S. seawater desalination plant built in Freeport, Texas

- Currently – over 15,000 desalination plants in operation worldwide
- 70% of U.S. desalination capacity uses reverse osmosis technology



## How much will the proposed project cost?

### Conceptual Project Costs

- ◆ Several components continue to be evaluated
- ◆ Costs will be shared equitably between the City and District
- ◆ Conceptual cost estimated at ~\$115 million (includes 30% contingency)

