



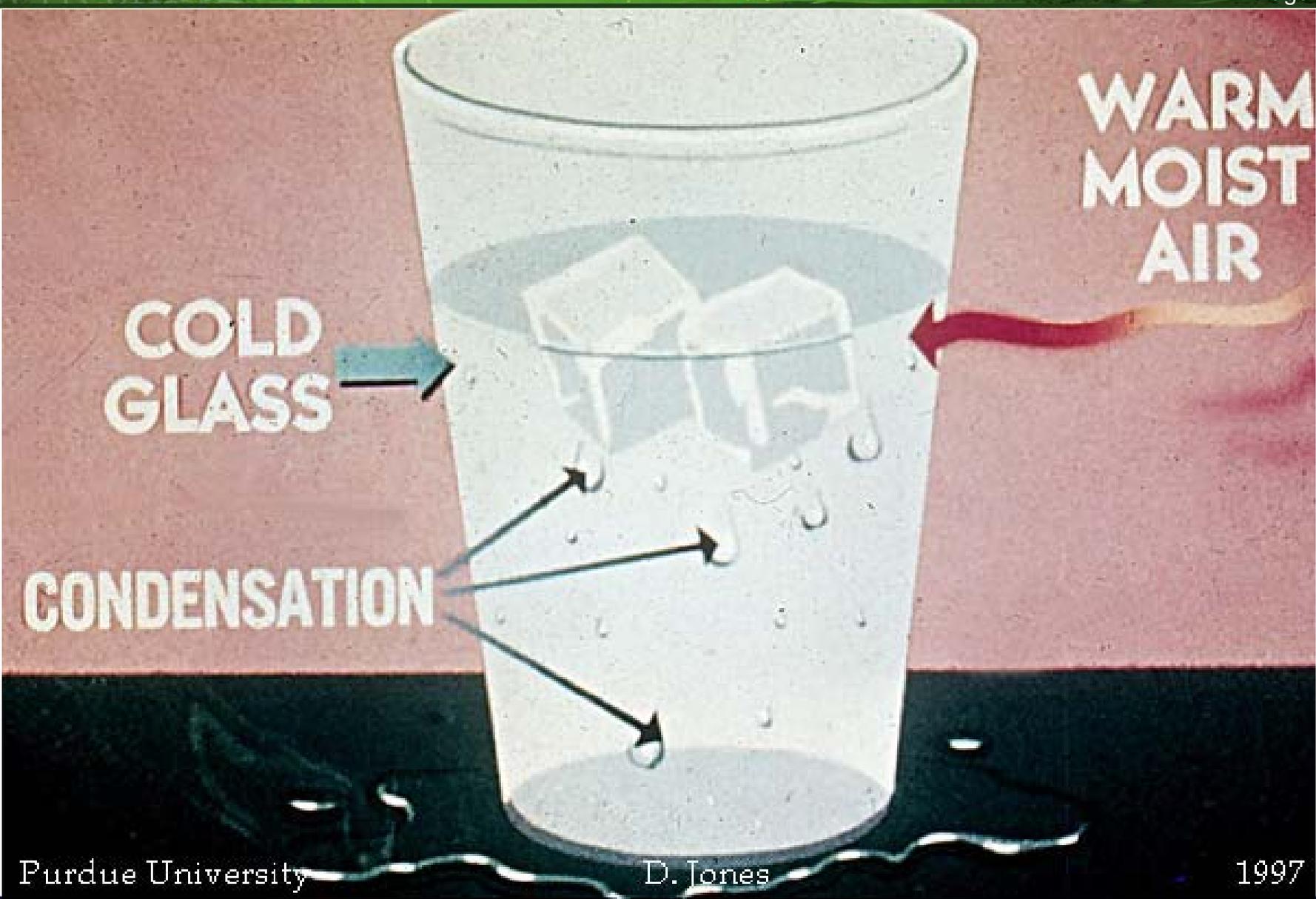
Condensate – Free Water

F-1014 October 9, 2009

WaterSmart09

Phil Weynand

Manager – Conservation



Definition

CONDENSATE

- Atmospheric moisture that has condensed because of a cold surface
- The air in contact with the cool surface loses its ability to hold as much moisture and that water condenses. The same way moist air that rises into colder air condenses to form clouds and, if it's really humid, rain.

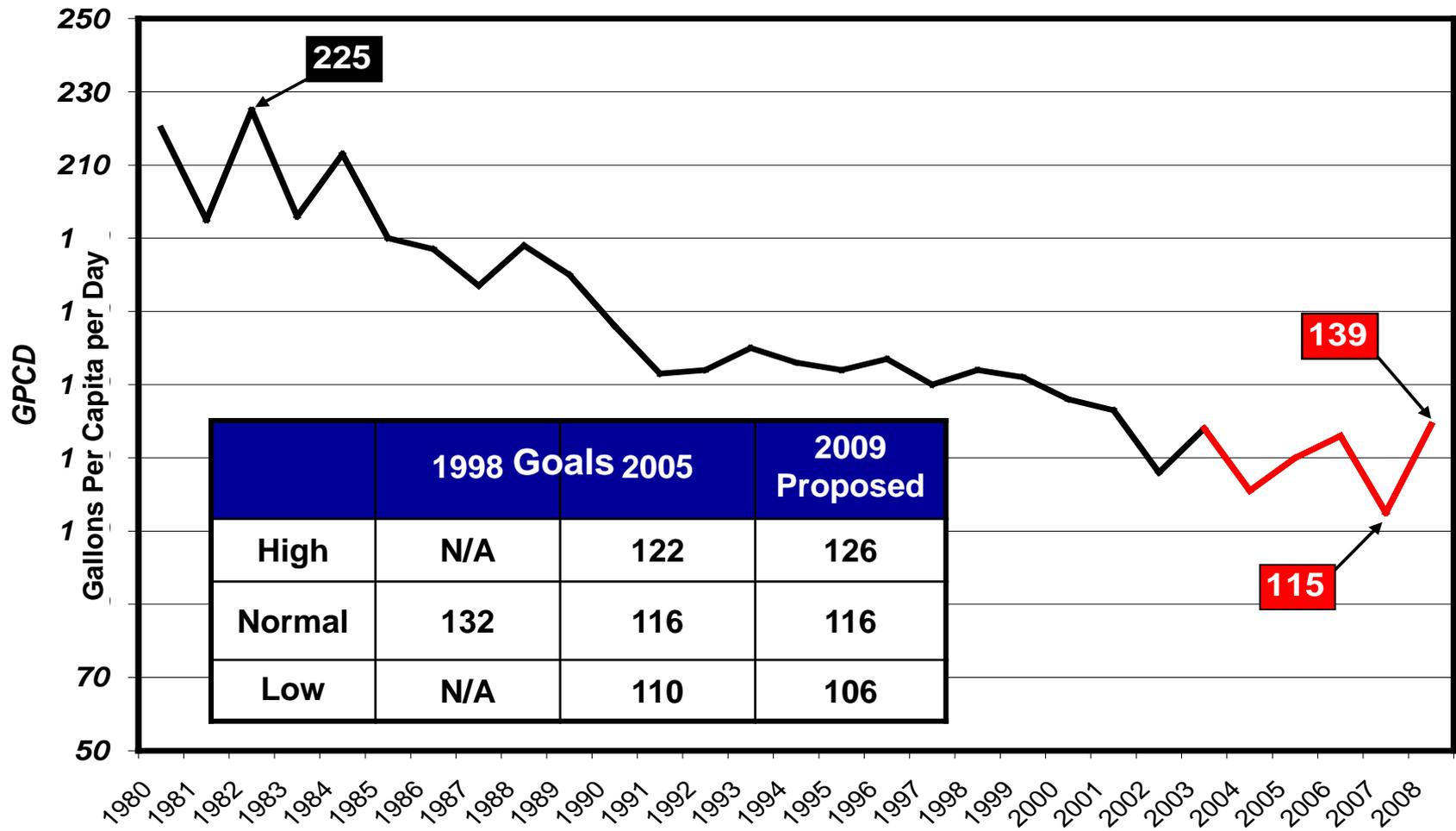
Conservation Program Goals

Reduce the need for water by looking at ALL of the ways water is used in San Antonio.

- Reach 116 gal/person/day within ten years.
- Save water at \$400/acre-feet
- Maintain quality of life in region

Conservation Effort Reduces Demand

Proposal - Demand Goals (GPCD)

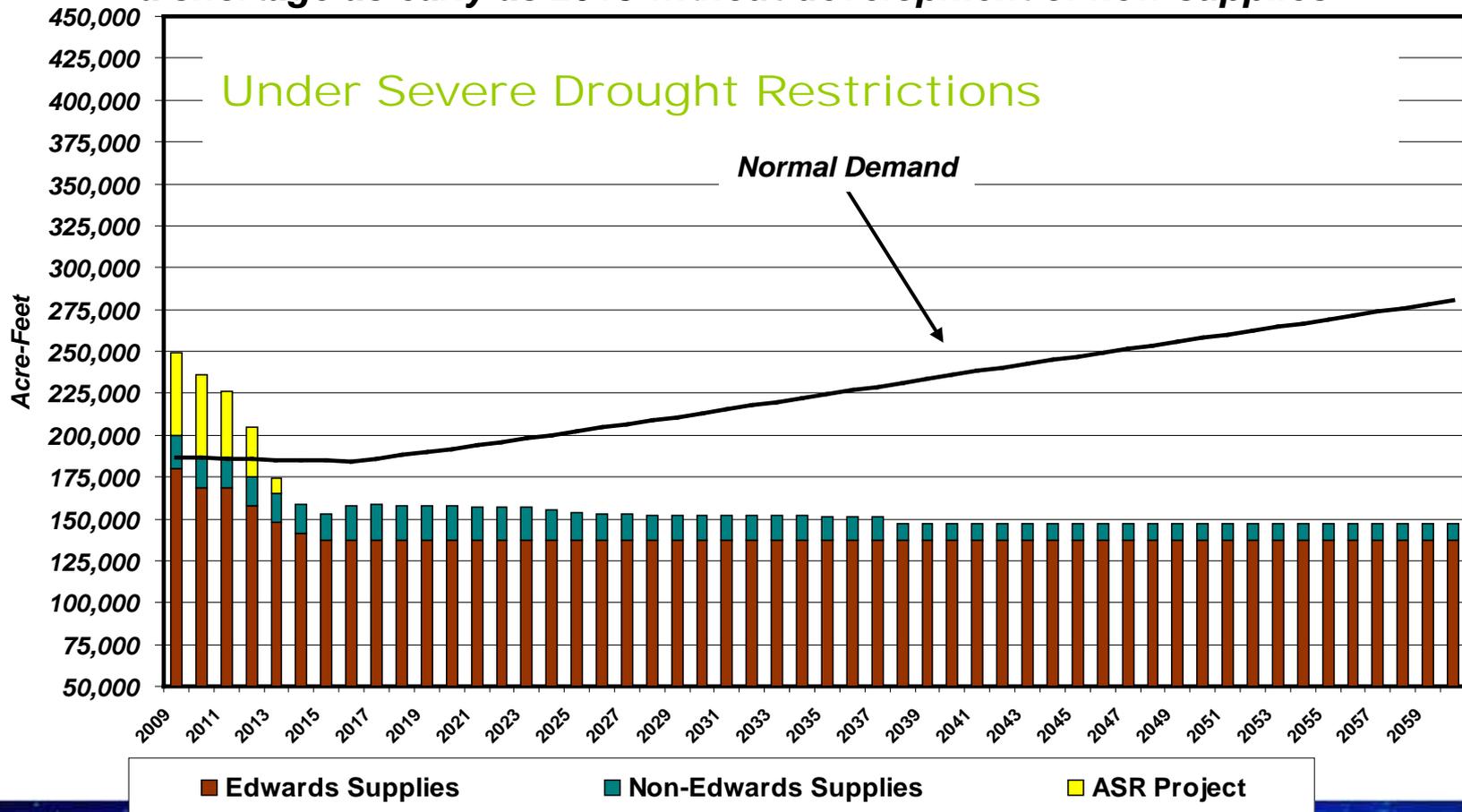


Unique Challenges

- **Plenty vs. Drought**
 - We have plenty of water in a “normal” year when rain falls.
 - But we lose up to 40% of our permit for our main supply in droughts.
 - Carrying 40% of capacity we will not use in most years is excessively expensive.
- **San Antonio is growing rapidly**
- **All new supply options are expensive and difficult**

Supply and Demand (Drought Conditions)

Edwards supplies would be cut by 40% in extreme drought, creating a shortage as early as 2013 without development of new supplies

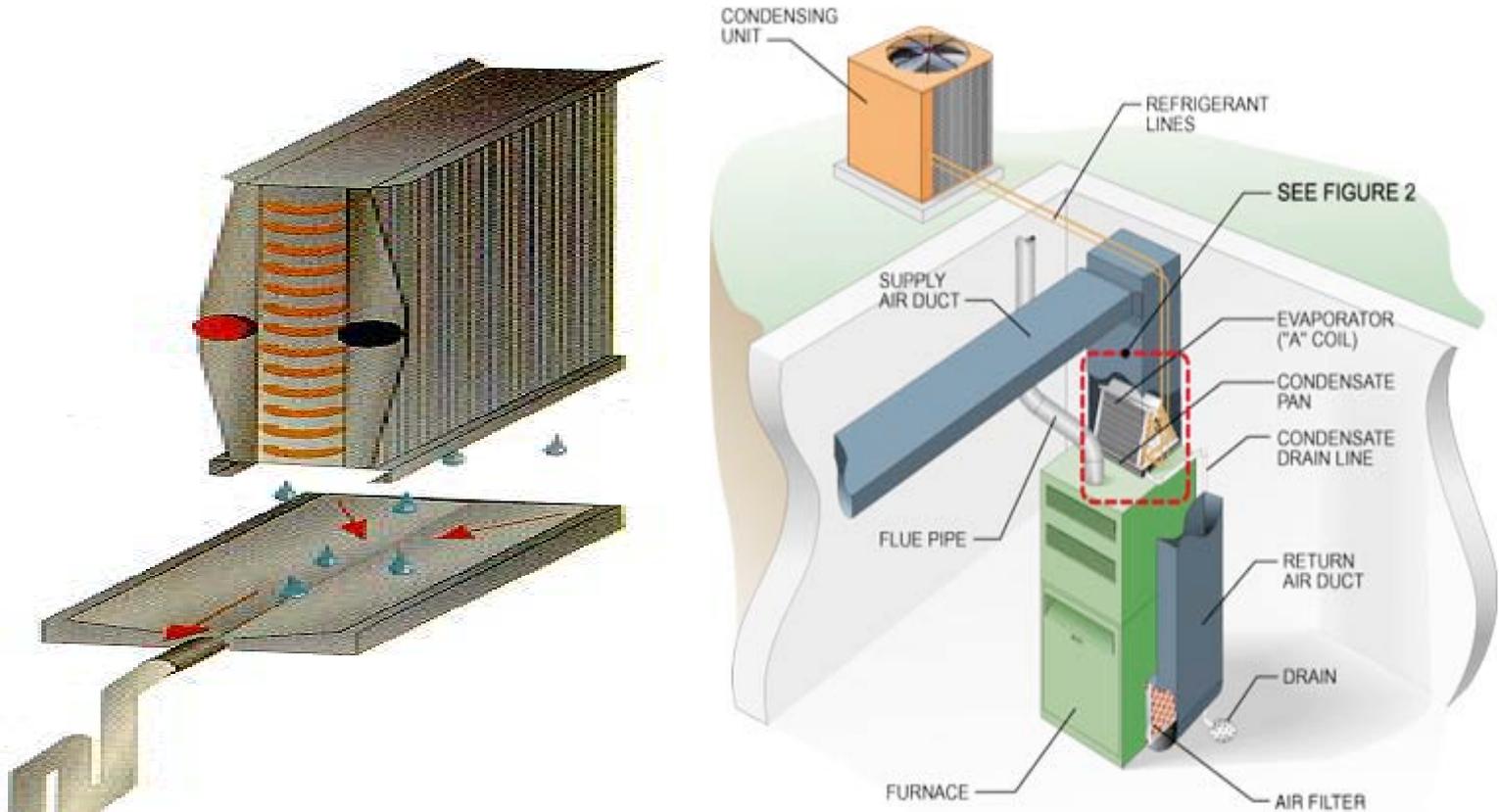


Air Conditioning Condensate, Why A Good Deal?



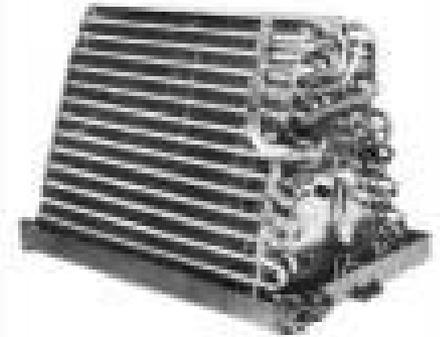
- Condensate is produced when need is high.
- Condensate water is **FREE**
- Condensate water is not restricted in usage as part of potable system
- Condensate water is high-quality

Residential Condensate



200 to 1,000 Gallons Per Month

Commercial & Industrial Condensate



Water Quality

- Condensate is a high quality source of water
- Condensate is similar to distilled water
- Suspended solids are low, the pH is neutral to slightly acidic, temperature is low
- It is important to keep air-conditioning equipment as clean as possible in order to ensure that condensate stays uncontaminated
- Evaporator coils and drip pans should be kept free of dust, dirt and other debris

City of San Antonio Ordinance

COSA 34-274.1 Condensate Collection

Newly constructed commercial buildings installing air conditioning systems on and after January 1, 2006 shall have a single and independent condensate wastewater line to collect condensate for future utilization.

Collection Potential

Condensate collection potential is dependent upon such factors as the size and operational load of the particular system, ambient temperature and humidity. A general rule of thumb is that .1 to .3 gallons of condensate is produced for every ton-hour.

Calculations

500-Ton AHU

Load Factor - 80 Percent

Actual Load - 400 Tons

Condensate Production =

.2 Gallons/Ton Hour

$400 \times 0.2 = 80$ gallons per hour

1.333 gallons per minute

57,600 gallons/Month

Application

- **Customer submits completed application and proposal to SAWS with the following:**
 - **Complete list of equipment with associated costs**
 - **Timeline of project**
 - **Conceptual design**
 - **Estimated water savings**
 - **Expected equipment life**

Terms of Rebate

- **Equipment must remain in use for 10 years or life of equipment, whichever is less**
- **The water saving project should be in an area that can be sub-metered or easily monitored to review water consumption**
- **Water use data must be collected before and after the retrofit and must be reported to SAWS**

Rebate

- **Based on**
 - **Actual water savings**
 - **Life of Equipment**
 - **Installation Cost**
- **Maximum of 50% of total project cost**

Tank Sizing

- The size of the tank will be determined by the end use.
- If the condensate will be used as continuous make-up for process water or cooling water, the tank can be relatively small.
- If the condensate will be used for supplemental irrigation, tanks will need to be sized based on condensate production rates and landscape requirements.

Case Studies



San Antonio Public Library



System Data

- Condensate Production: 10:30 AM, Aug. 16, 2002
- 1+ GPM Daily Condensate Recovery Potential
- Total Based on Single Sample Event – 1440 GPD

System Data Cont.

26,000 Square Feet of Landscape

1,440 Gallons Day Potential

Surplus Storage Need = 8,835 Gallons
(June, July & August)

Drip Irrigation

Ferro-Concrete Collection Tanks

Total Cost = \$21,500.00

Rivercenter Mall



Collection Potential =
12,000,000 Gallons/Year



End Use – Cooling Tower Make-Up Water



Total Savings = 12 Million
Gallons Per Year



System Data

- Condensate from Four Air Handlers
- Annual Savings = 12,000,000 Gallons
- 1,000 Gallon Storage Tank
- Cooling Tower Make-up
- Total Cost - \$32,058
- Financial Savings/Year - \$49,500*
- Simple Payback Period – **8 Months**

***Water and Sewer Savings**

SONY SEMICONDUCTOR, 1999

System Data

- Condensate from three air handlers
- Annual Savings = 1,871,000 Gallons
- Piping, three return pumps and meter
- Cooling Tower Make-up
- Total Cost - \$5,777
- Financial Savings/Year - \$4,371*
- Simple Payback Period – **16 Months**

***Water and Sewer Savings**

HEB Grocery Distribution Center, 2003

System Data

- Condensate from air handlers and refrigeration systems
- Annual Savings = 6,200,000 Gallons
- Boiler Feed Make-up Water
- Total Cost - \$19,000
- Financial Savings/Year - \$20,600
- Simple Payback Period – **11 Months**
- ***Water and Sewer Savings**

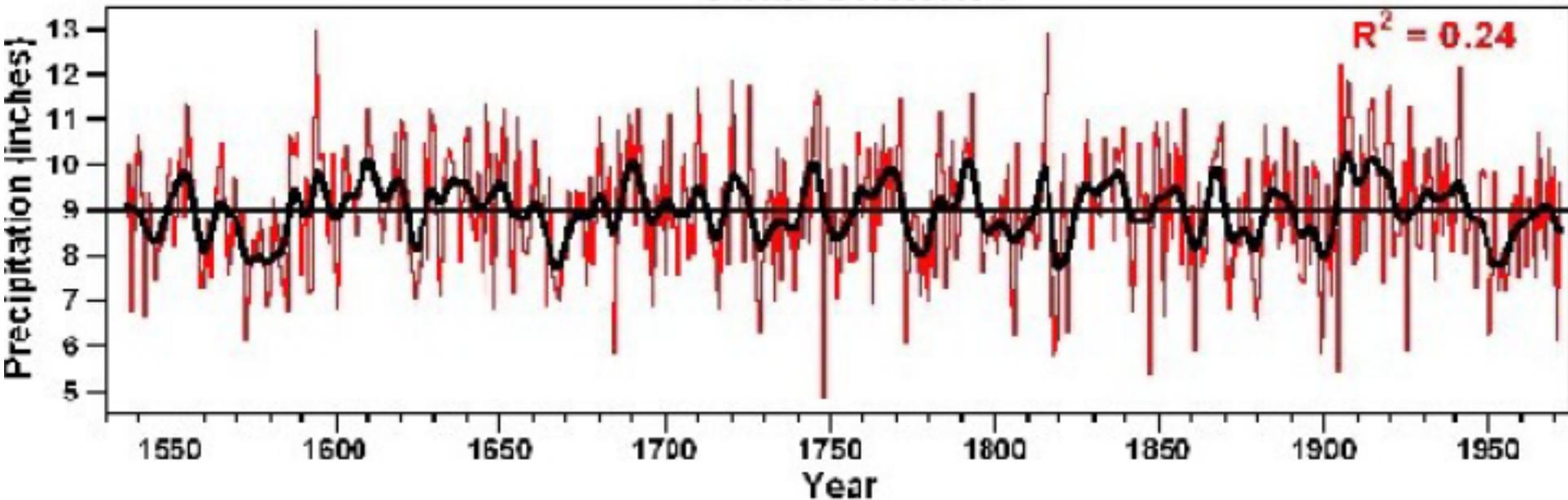
Biological Controls

Depending on the end use or the storage requirements, the user may want to consider regular biological testing and/or treatment (UV, ozone, chlorine, bromine, etc.)



How Dry? 1560's vs. 1950's

Reconstructed Precipitation
February - May
Texas Division 6





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