MONTEREY PENINSULA WATER MANAGEMENT DISTRICT

CALIFORNIA AMERICAN WATER

RAINWATER HARVESTING

Presented by:

HANDY DAN GREENWISE CONSTRUCTION & LANDSCAPES

SUSTAINABLE Del Rey Oaks

Mission:

...to promote sustainable rainwater harvesting practices to help solve potable, non-potable, storm water and energy challenges throughout the world, our State and right here at home on the Monterey Peninsula.

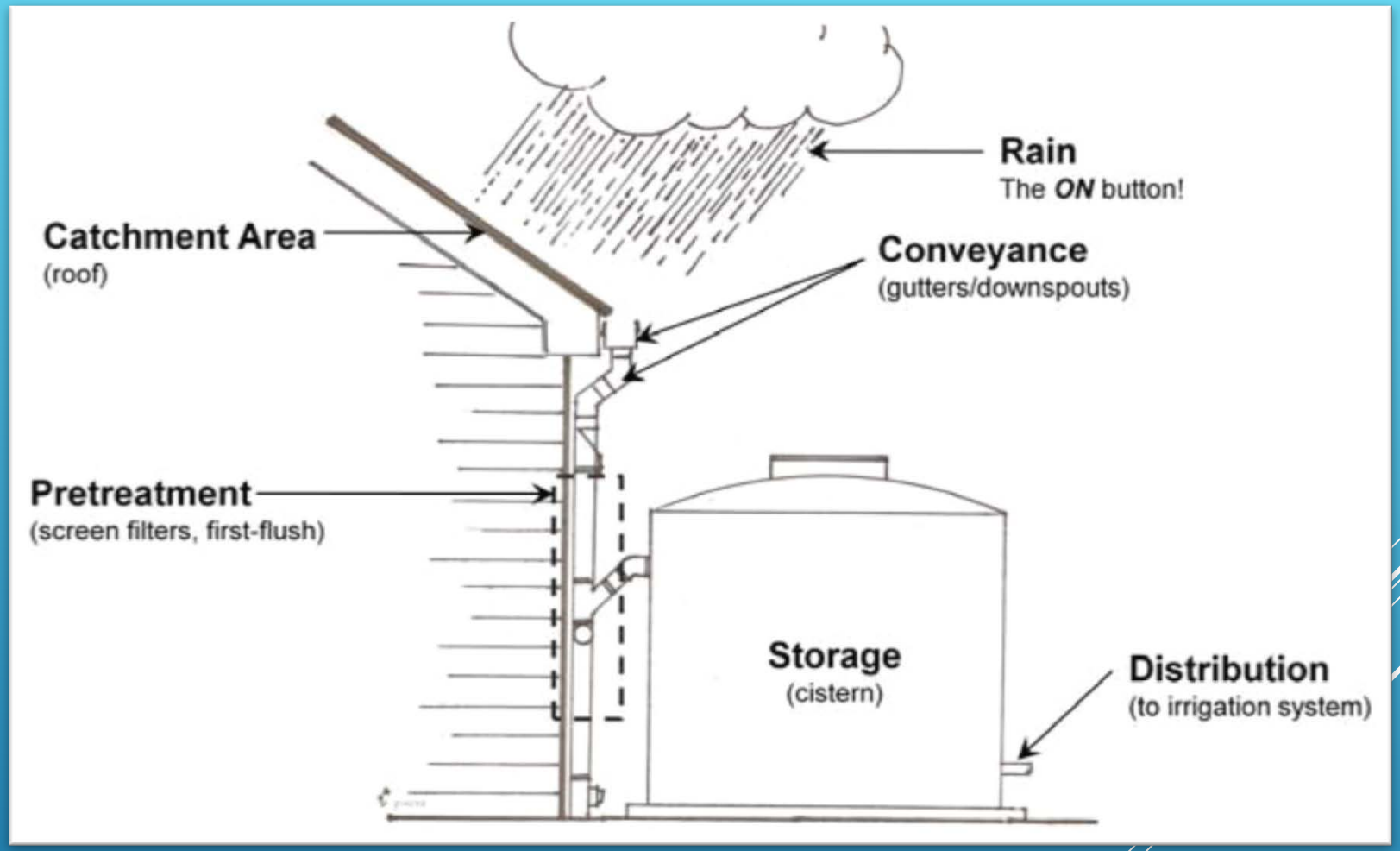
RAINWATER HARVESTING

Definition:

The capture, diversion, and storage of rainwater for later use.

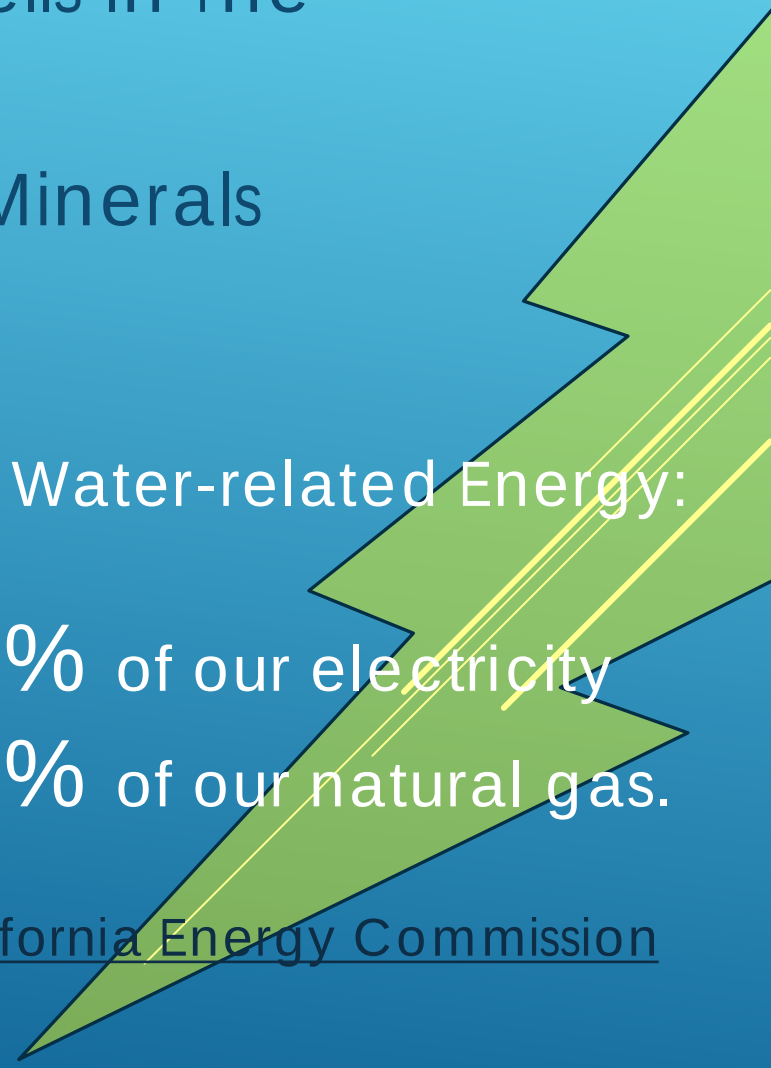
COMPONENTS RWH

- Catchment
- Conveyance
- Treatment
- Storage
- Delivery



- Get “Off The Grid”
- Save Money and Energy, It’s Less Expense Than Drilling a Water Well, Permits are not Available for Wells In The Carmel Valley at This Time
- Retain High-quality Water: Soft and Low in Minerals
- Help Manage Storm Water Problem
- Help Recharge Aquifers – Raingardens!
- Reduce Soil Erosion and Flooding

ADVANTAGES RWH

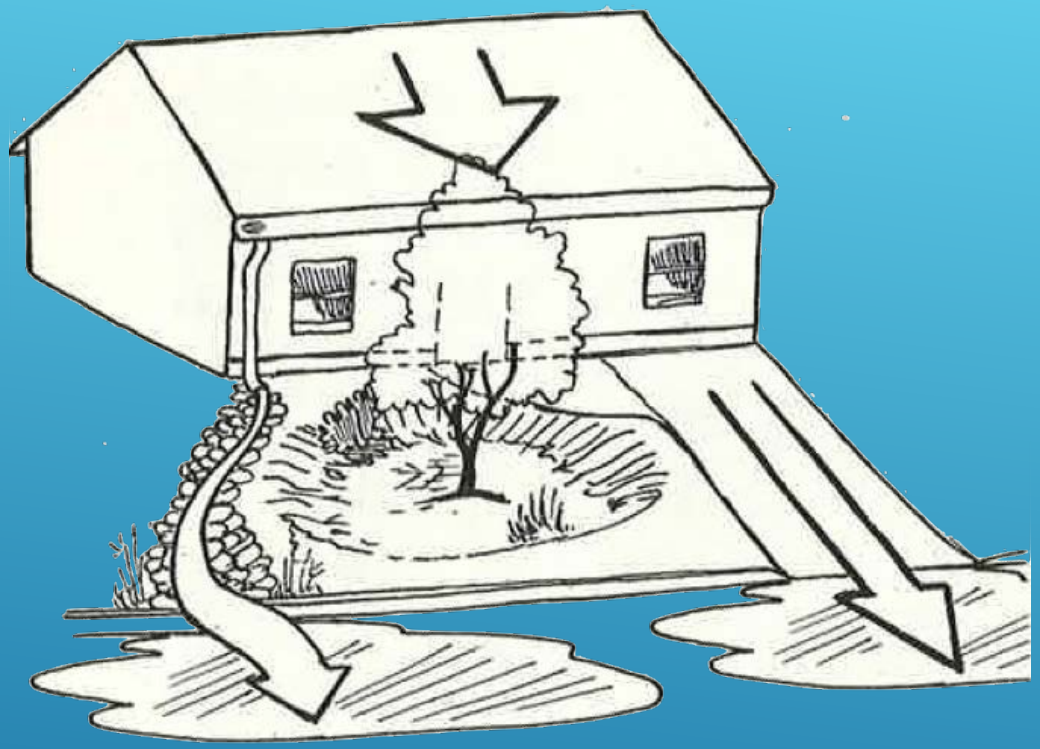


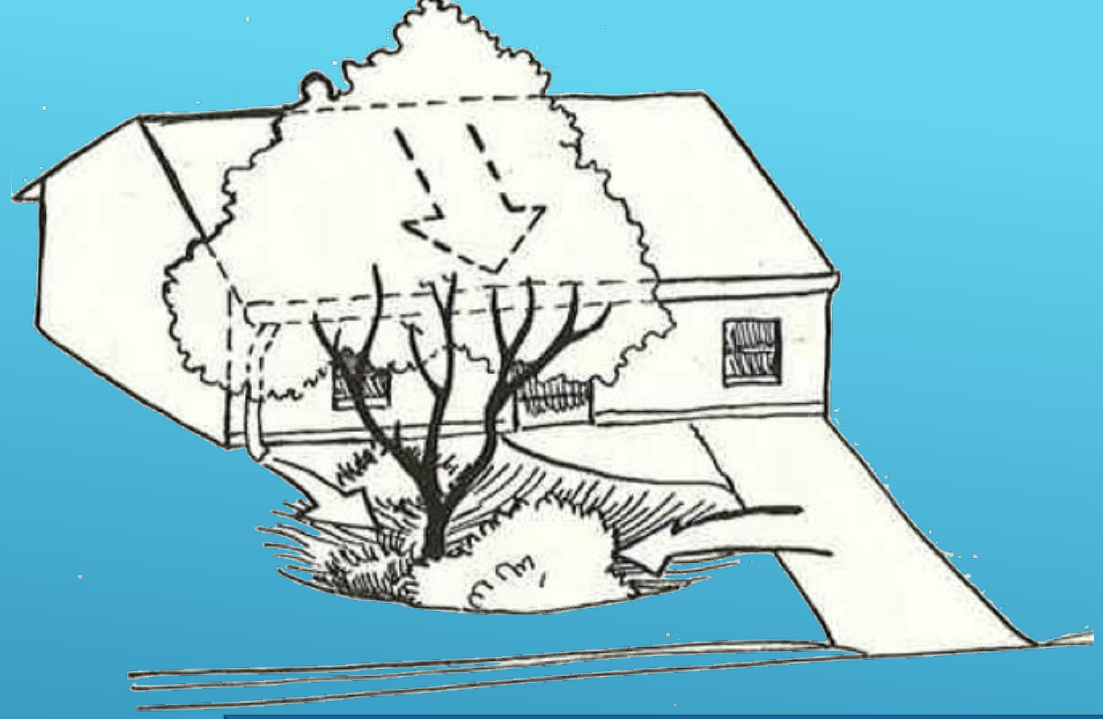
CA Water-related Energy:

20% of our electricity

30% of our natural gas.

California Energy Commission





RUNOFF VS RETENTION

Retaining water on your property benefits your:

1. Yard
2. Pocket book
3. Environment
   - Aquifers are recharged
   - Less energy used
   - Enhance garden and property

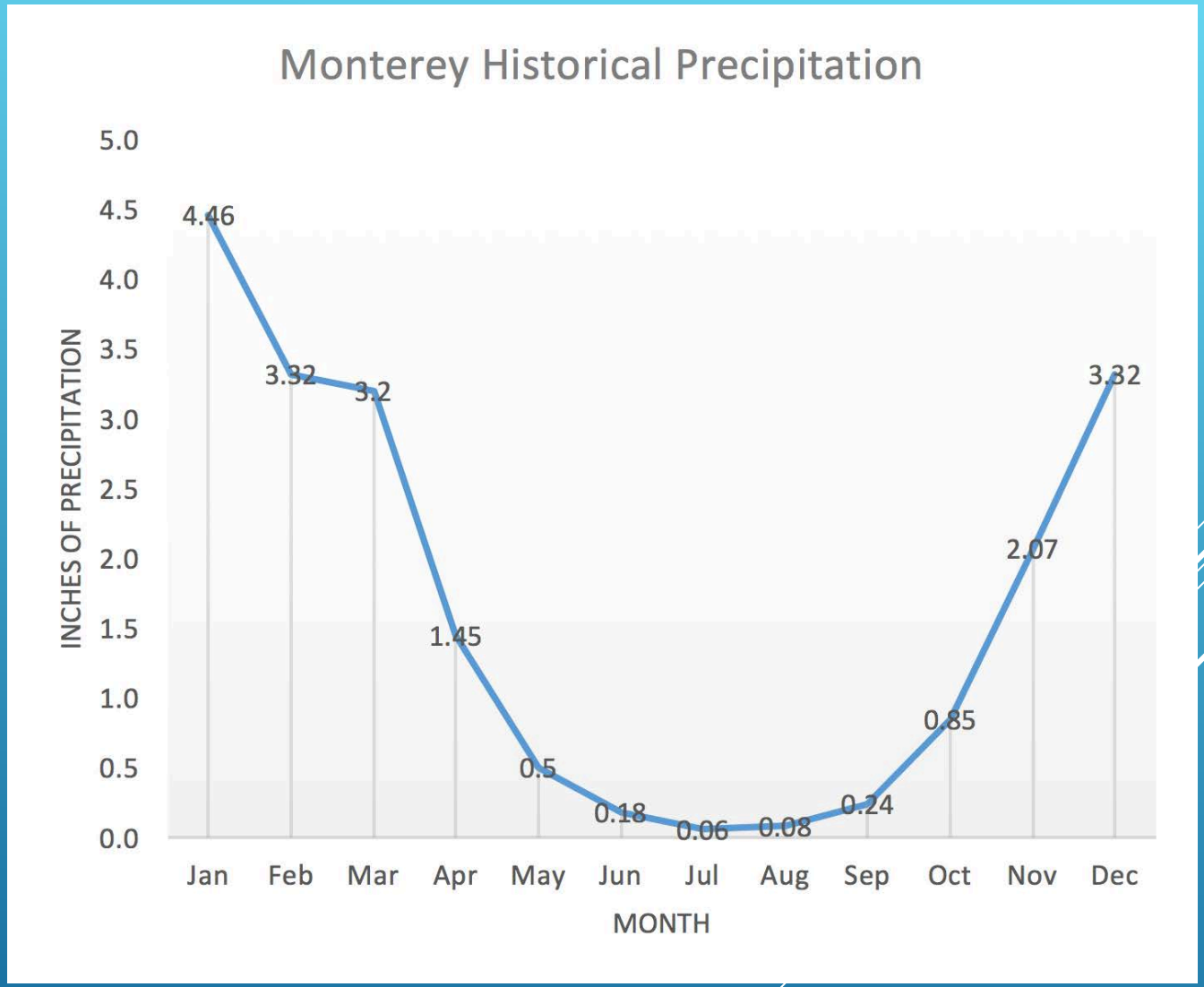
Monterey gets

19.7 inches

of rain each year

(average since 1904)

HOW MUCH DOES IT RAIN HERE?

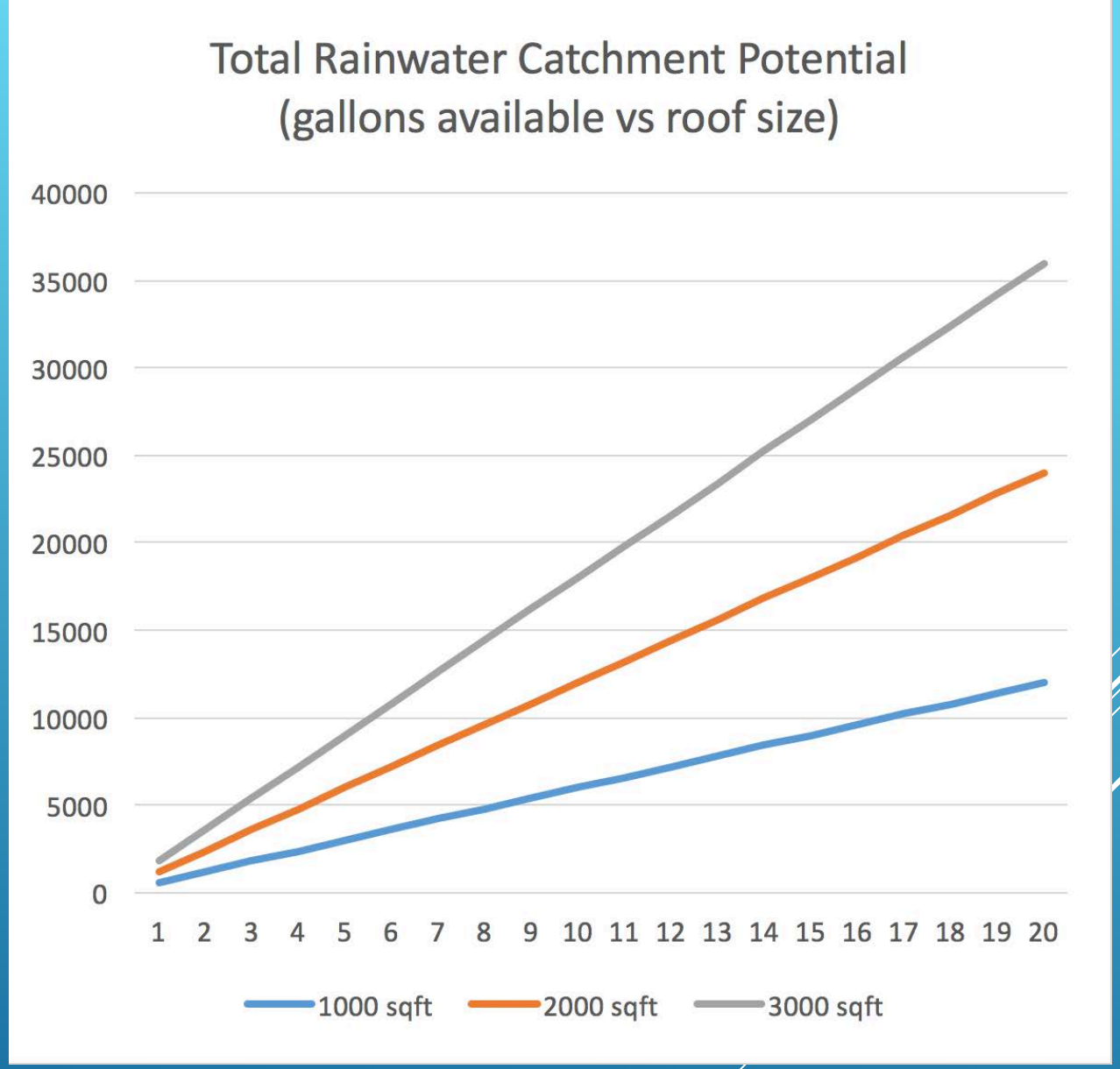


Amount depends on your available catchment areas.

(and available storage area…)

1000 sqft = 600 gal/inch

HOW MUCH WATER CAN I CAPTURE?

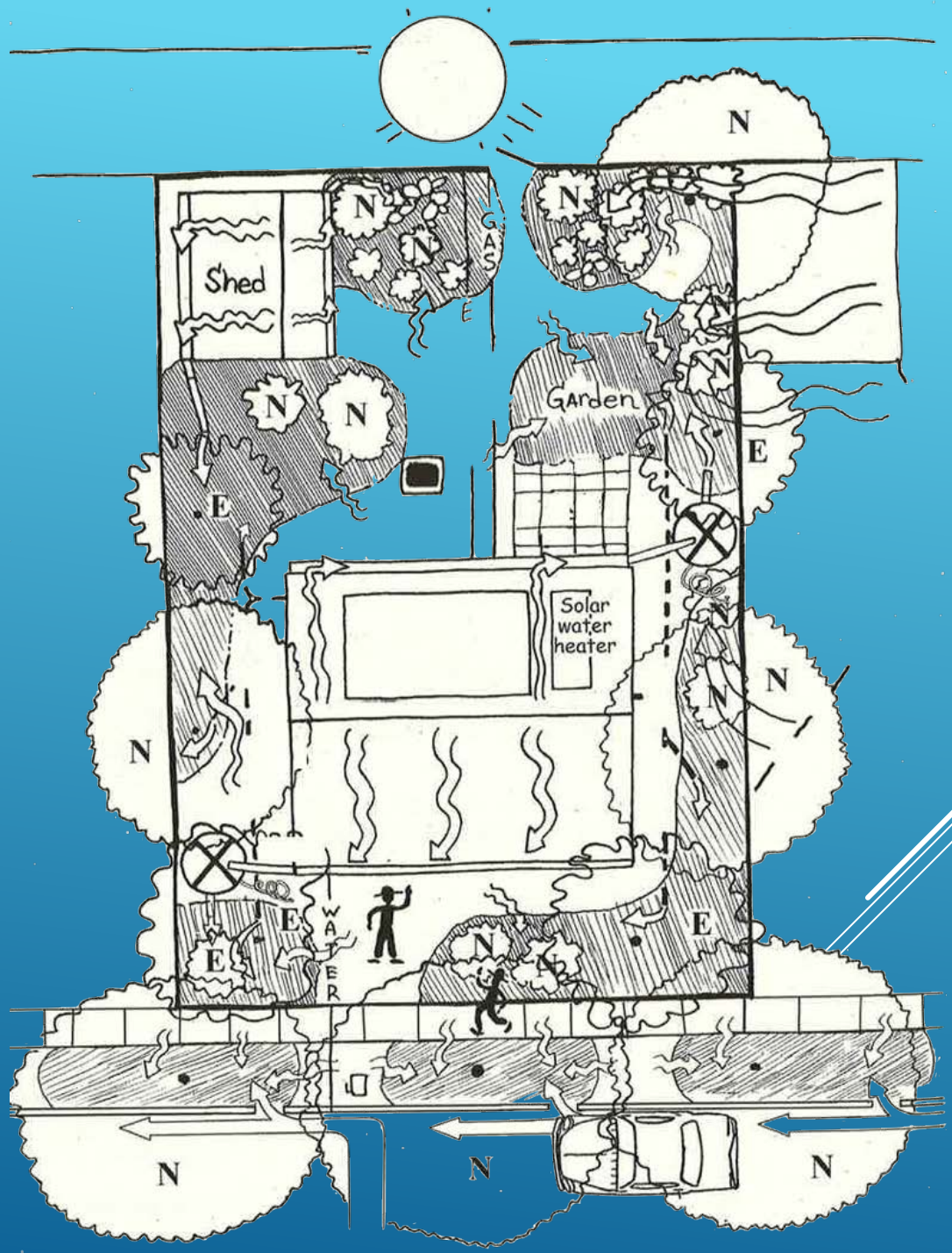


Harvested water (gal) = Catchment area (ft2) X Rainfall depth (in.) X 0.623 Conversion factor
1000 sq. ft. of Roof, with 1” of Rain Produces 600 Gallons of Water!!!

Consider:

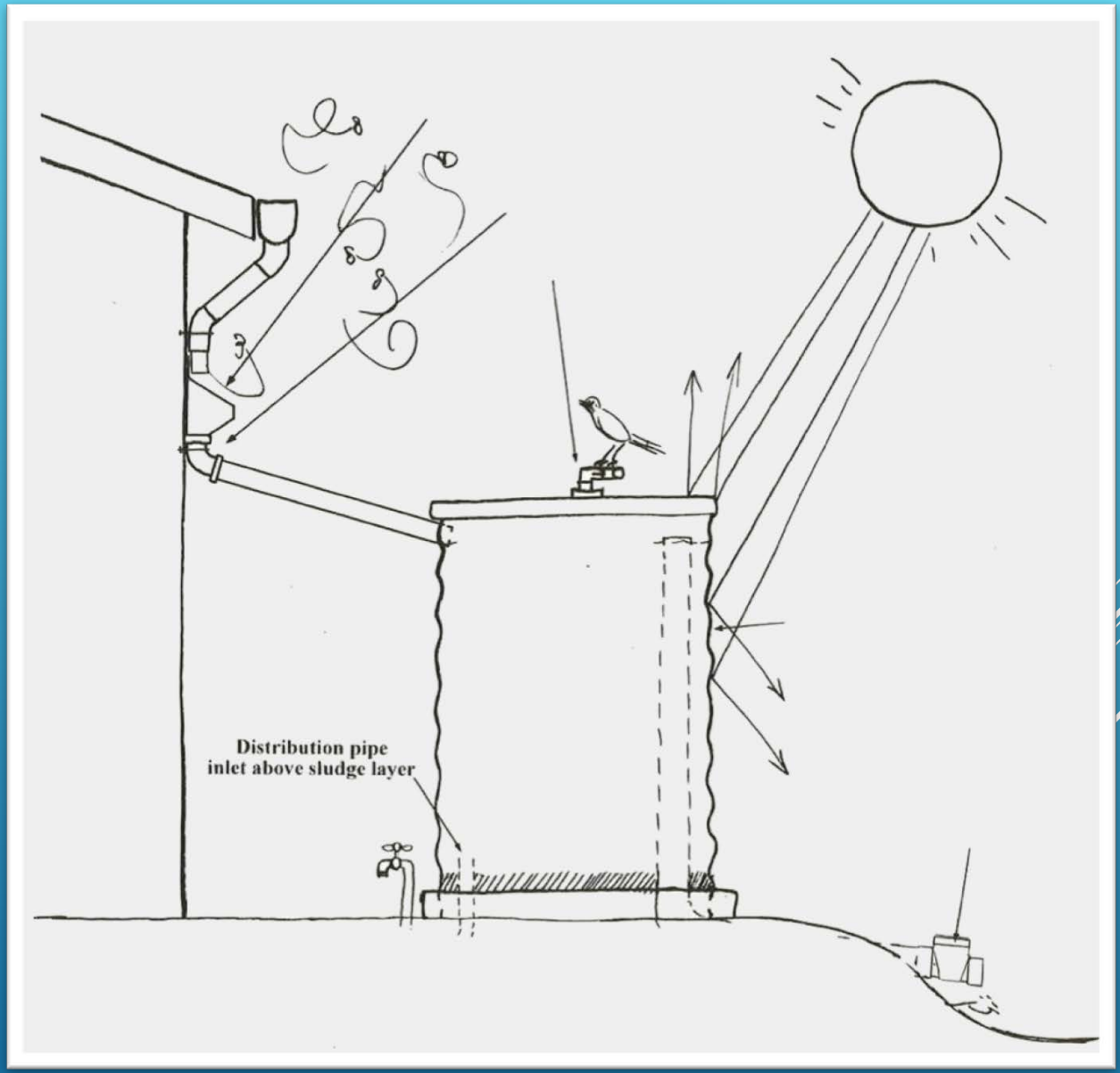
- Landscaping
- Hardscaping
- Catchment Areas
- Storage Locations passive or active or complex system
- Irrigation Systems
- In home use

HOLISTIC SYSTEM

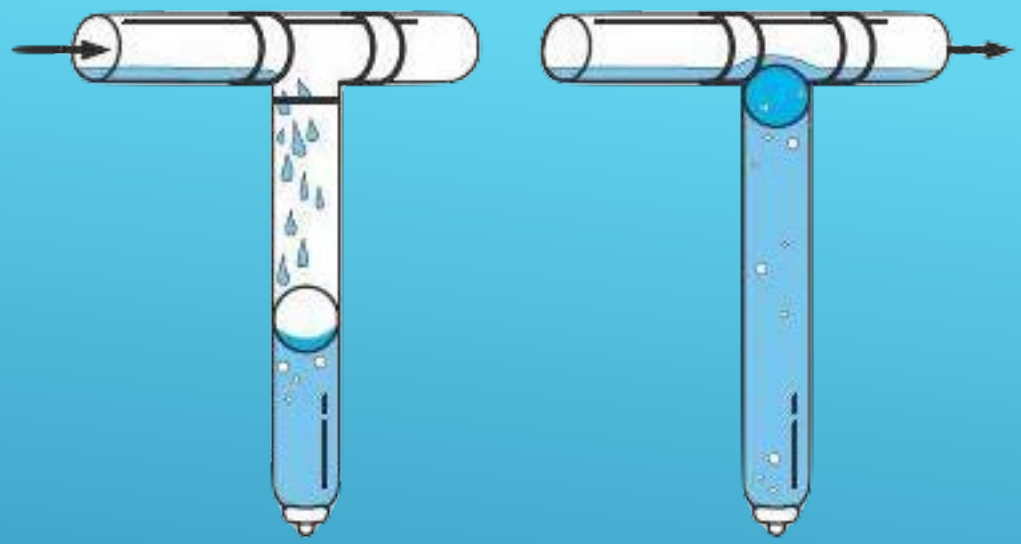


- Sunlight
- Birds/Animals
- Insects
- Outlets

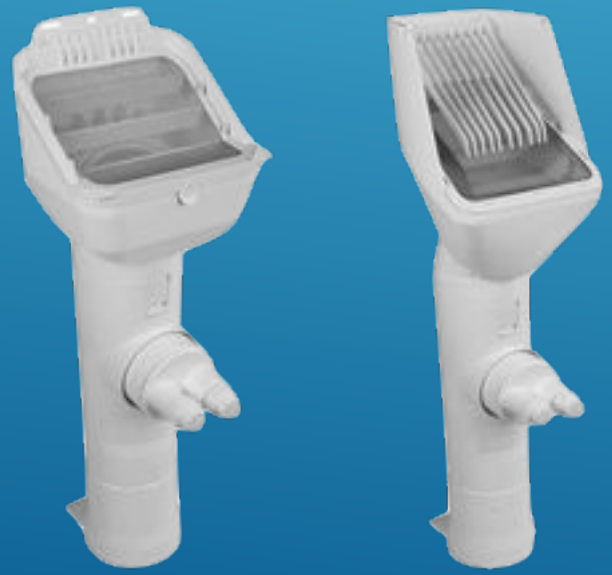
PROTECTION CONSIDERATIONS FOR YOUR RWH SYSTEM



- After Long Dry Spells, Roofs are Dirty
  - Pollutants from air
  - Bird droppings
  - Dirt
- First Flush Devices Divert Initial Catchment to Sewer or Bioswale



FIRST FLUSH DEVICES NECESSARY FOR CLEAN WATER



RAIN BARREL IDEAS SAVING WATER AT YOUR HOME

LARGE STORAGE OPTIONS

- Above Ground
  - Corrugated Steel
  - Plastic
    - Cylindrical
    - Slim-line
  - Bladder
- Below Ground
  - Cylindrical vs Box

Requires a deep dig, but...

Tank may be emptied in ground.

BELOW GROUND: CYLINDRICAL VS BOX

Limited space, commercial projects, fire locations

Low profile allows for a shallow dig, but...

This tank must be left ¼ full.

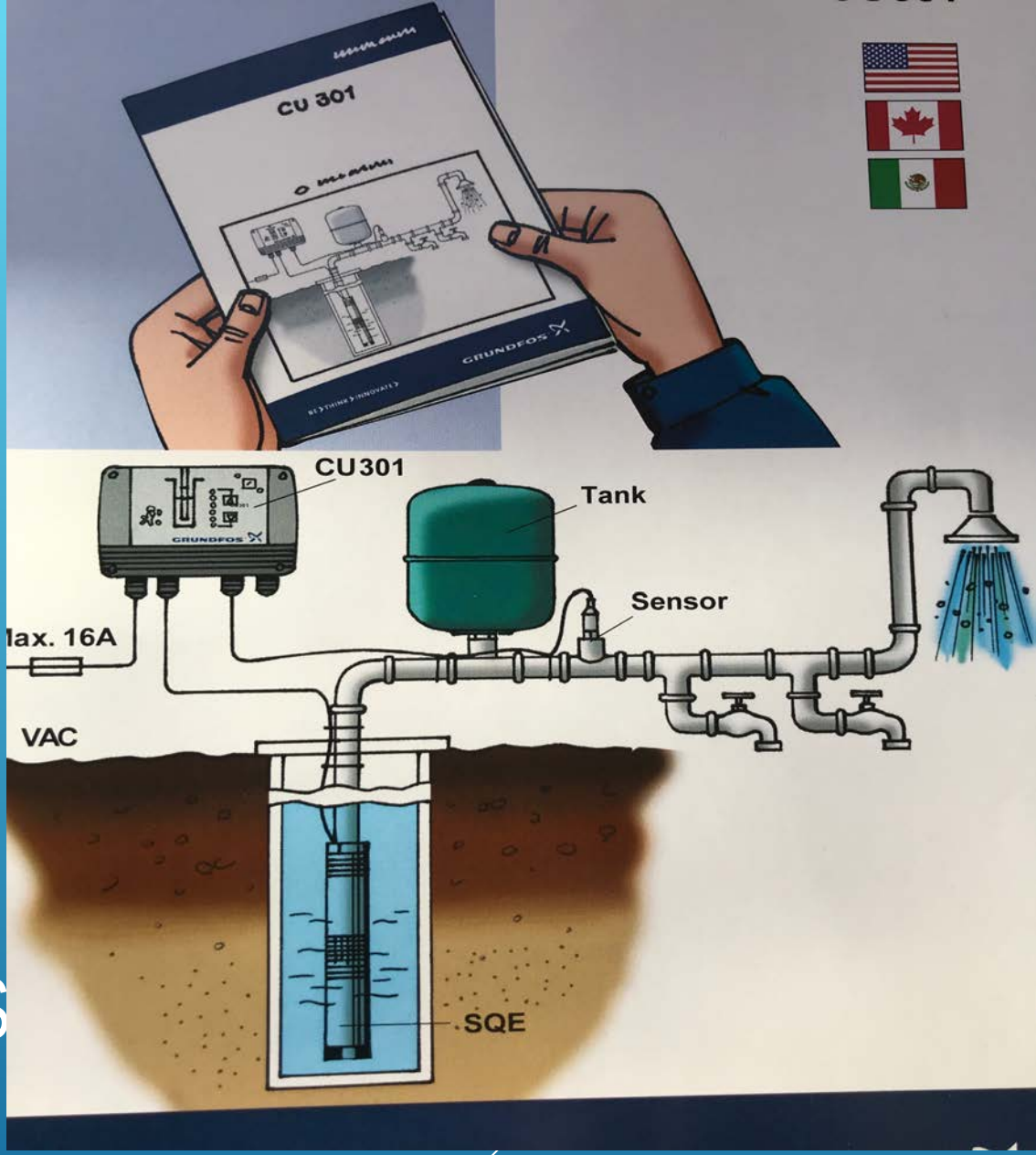
AN IDEA THAT'S BEEN AROUNDA WHILE, ISTANBUL (330 AD) AND HERCULANEUM(79 AD).

ABOVE GROUND: CORRUGATED STEEL

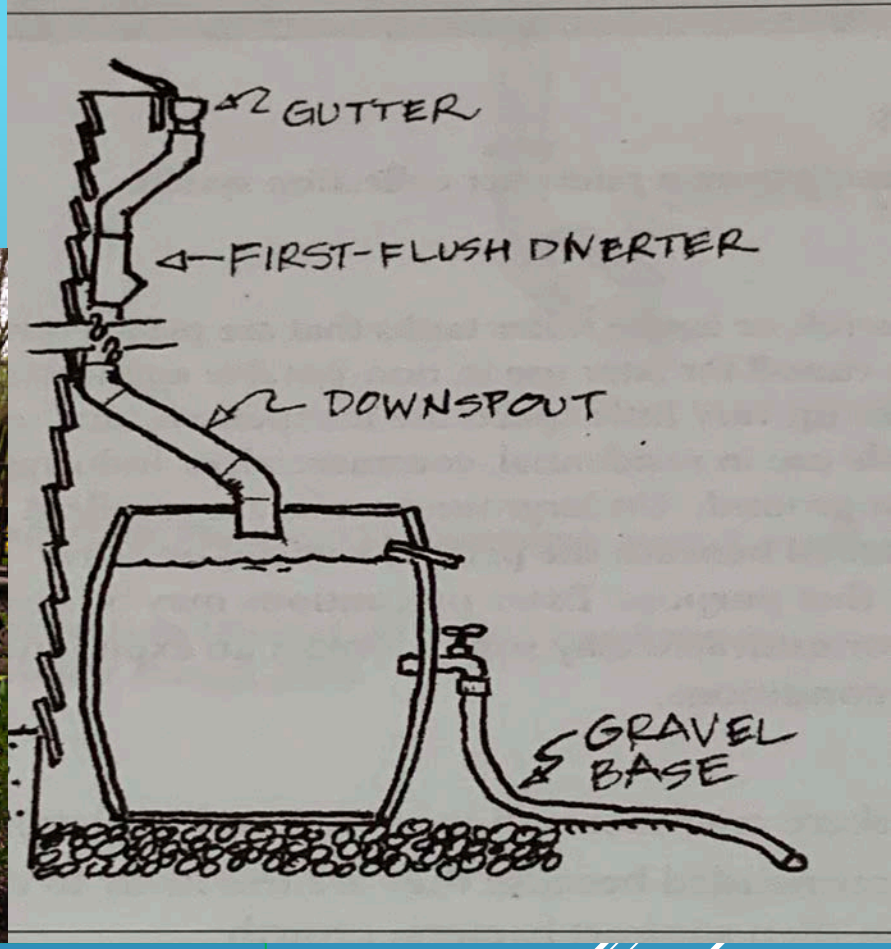
- Advantages
  - Scale to very large sizes (50K+)
  - Construct on site
    - Enables access to tight spots
  - More attractive in right setting
- Disadvantages
  - Larger sizes require concrete pad and engineering

ABOVE GROUND: PLASTIC

- Advantages
  - Easy to install
  - Variety of sizes and colors
  - Slim-Line options
- Disadvantages
  - Sometimes requires multiple tanks to meet need
  - May need crane to get to some back yards if access is narrow



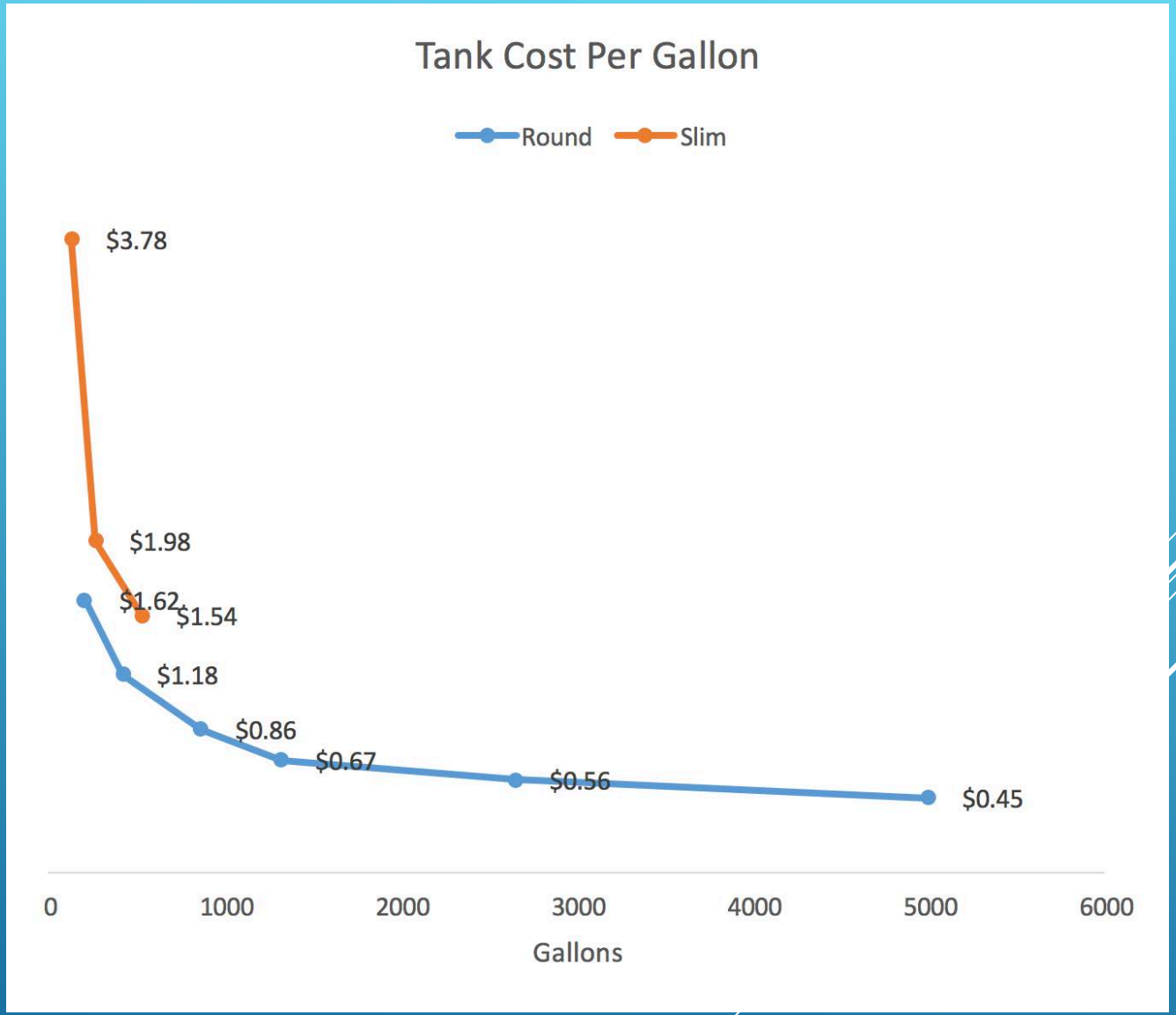
PUMPS FOR WATER SYSTEMS



EVERYONE LOVES THE RAIN BARREL

Slim-Line tanks are smaller and cost more than Cylindrical

CYLINDRICAL VS SLIM-LINE



ABOVE GROUND: BLADDER

- Advantages
  - Easy to install
  - Custom sizes
  - Hidden under deck or house
- Disadvantages
  - Not designed for direct exposure to the elements

UNDER HOUSE INSTALLATION

Treatment – After Storage

Multi-Barrier Approach

- Filtration
  - Reverse osmosis
- Disinfection
  - Chlorination
  - Ultraviolet light
  - Ozonation
- Adsorption

AgriLIFE EXTENSION

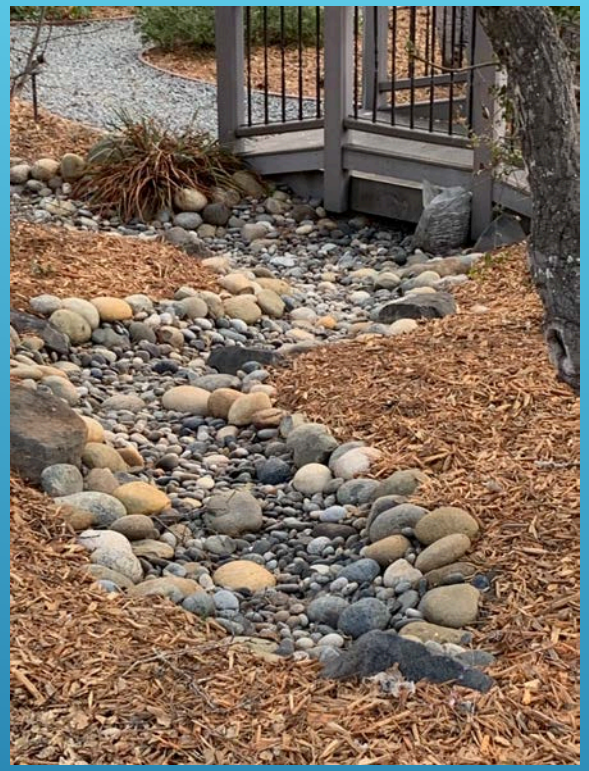
TREATMENT

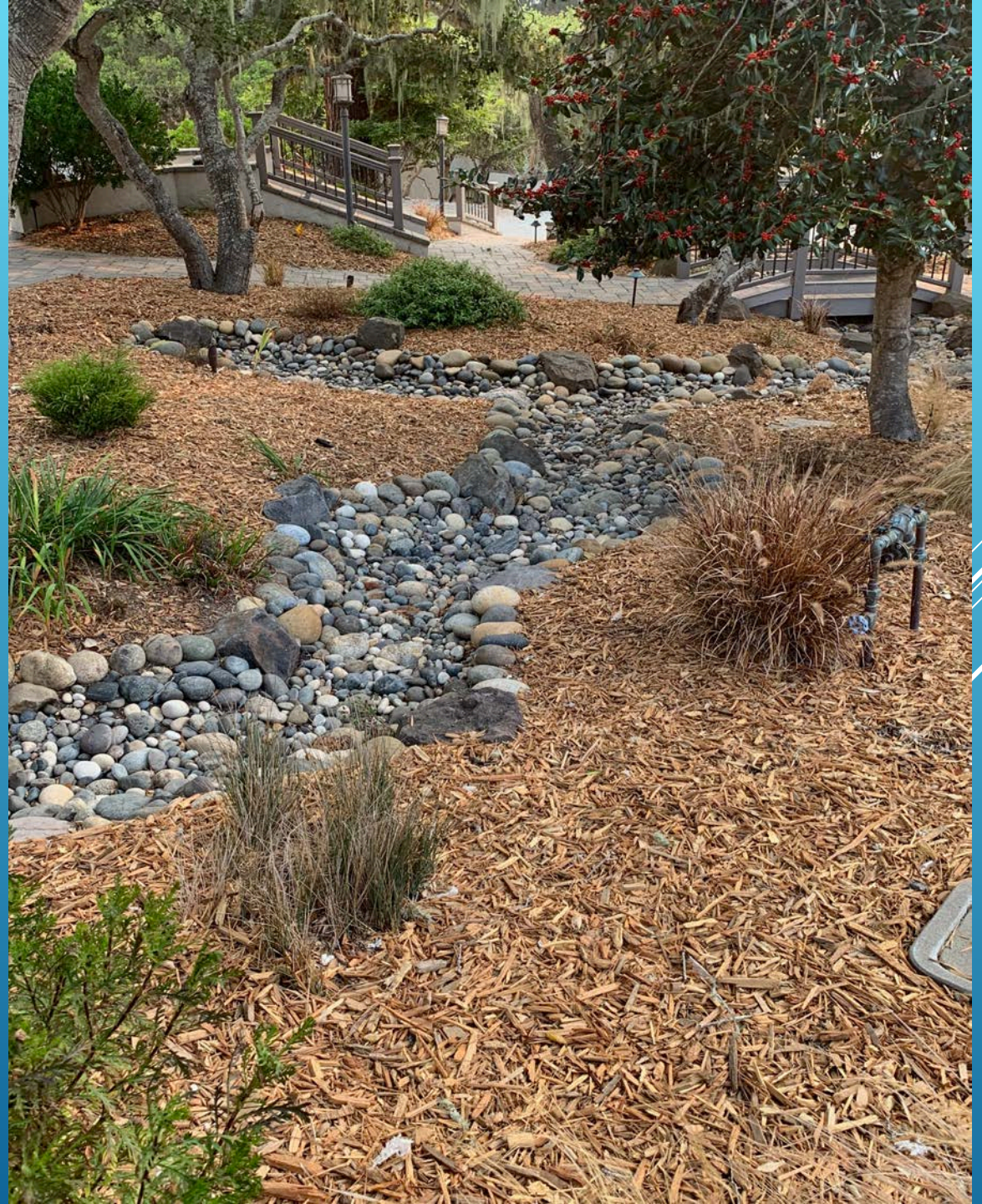
For irrigation, treatment is not required, With filters and UV rainwater is made potable and safe onsite.

Definition:

Landscape elements designed to remove silt and pollution from surface runoff water. They consist of a swaled drainage course with gently sloped sides (less than six percent) and are filled with vegetation, compost and/or riprap.

BIOSWALE





DISTRIBUTION

For irrigation, water may be routed from your tank to a hose bibb or a manifold.

Water is allowed to flush toilets.

Washing clothes and household items.

Showers and bath

Depending on tank location and need, a pump may be required.

Irrigation Manifold

In-home Use (Pending)

Hose Bibb

HOW MUCH WILL A SYSTEM COST? THAT DEPENDS ON SO MANY THINGS

Rainwater System Costs depend on many factors:

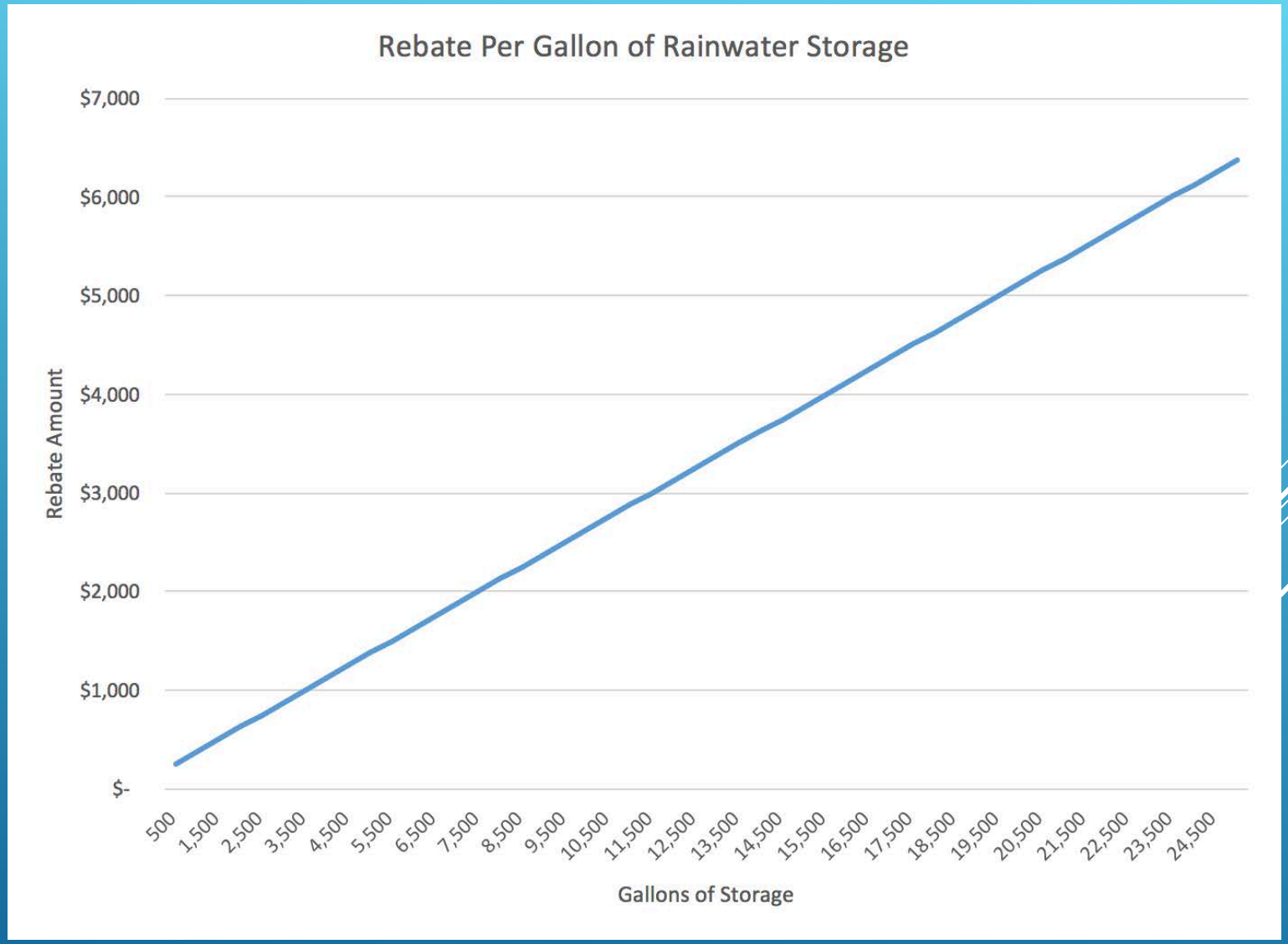
- Storage Amount
- Storage Type
  - Above/Below Ground
  - Tank Type
- Accessibility
- Distribution and pumping
  - Hose bibs
  - Irrigation System Connection
  - In-house

REBATES

$50 per 100 gal
(up to 500 gal)

$25 per 100 gal
(500-25,000 gal)

Max Rebate = $6,375



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THANK YOU FOR YOUR TIME.
ANY QUESTIONS?