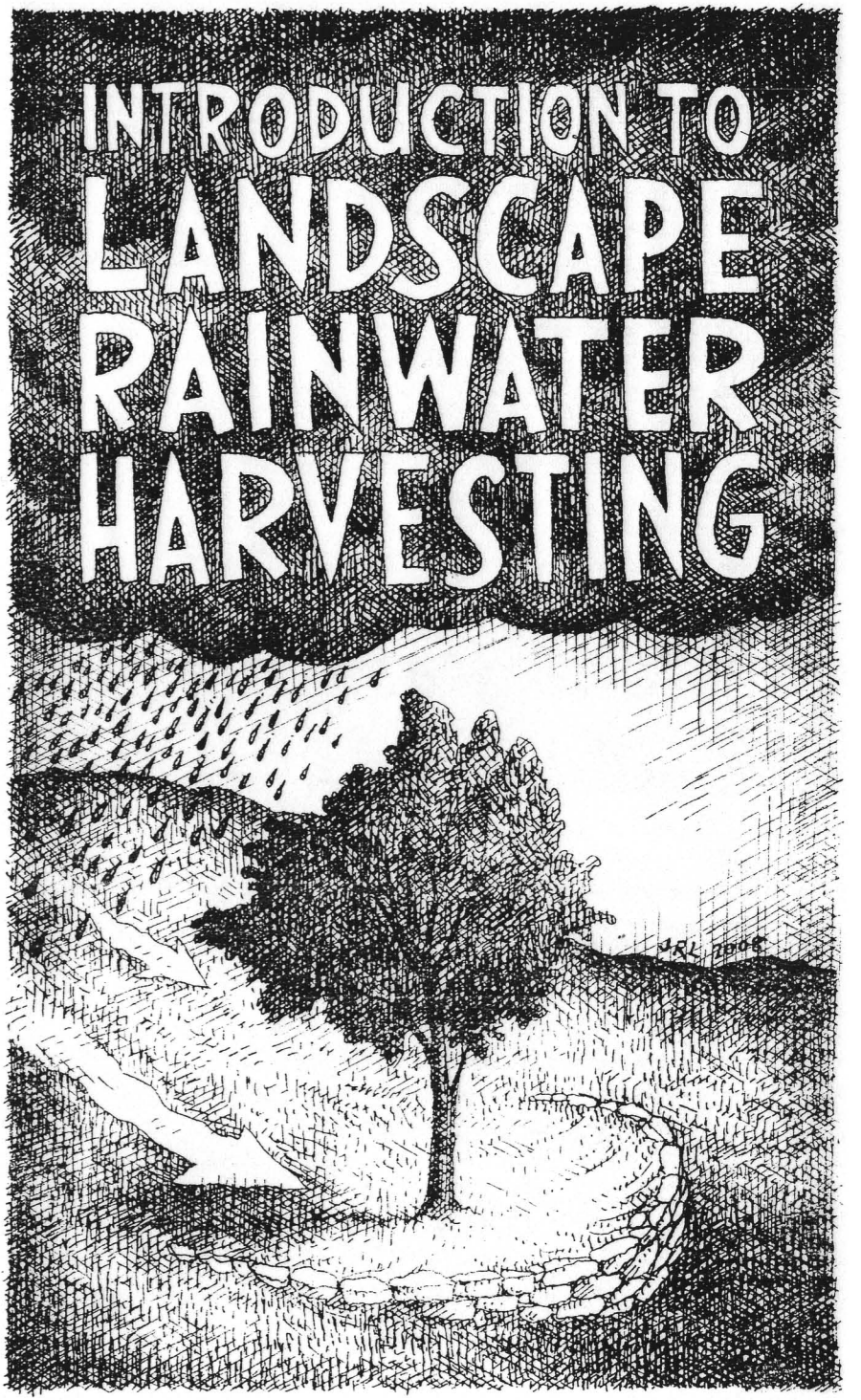

INTRODUCTION TO
LANDSCAPE
RAINWATER
HARVESTING

from Brad Lancaster's Rainwater Harvesting Vol. 2 :

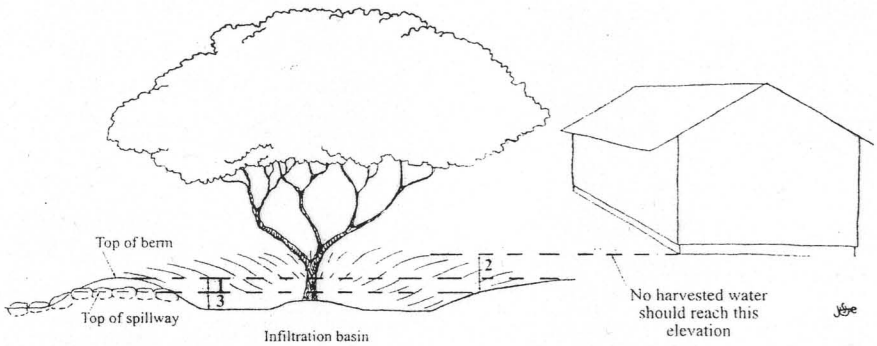
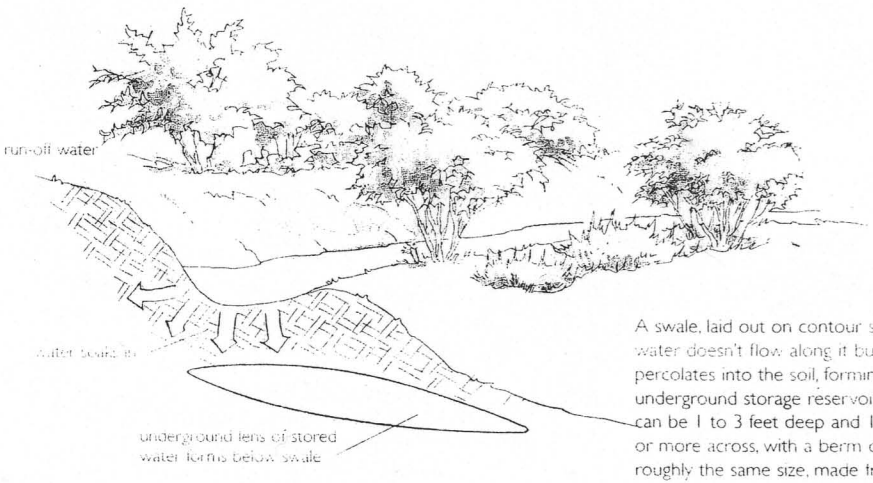



Fig. 1.12. Three important elevations: Elevation 1: Overflow spillway is the low point of earthwork's perimeter. Elevation 2: Spillway is low enough to ensure nothing is accidentally flooded. Elevation 3: Basin is lower than elevation of spillway to ensure water is harvested, rather than drained.

from Toby Hemenway's Gaia's Garden :




A swale, laid out on contour so that water doesn't flow along it but instead percolates into the soil, forming an underground storage reservoir. Swales can be 1 to 3 feet deep and 1 to 4 feet or more across, with a berm downslope roughly the same size, made from the soil from the swale.

(See back cover for recommended books list)

This booklet
accompanies the course

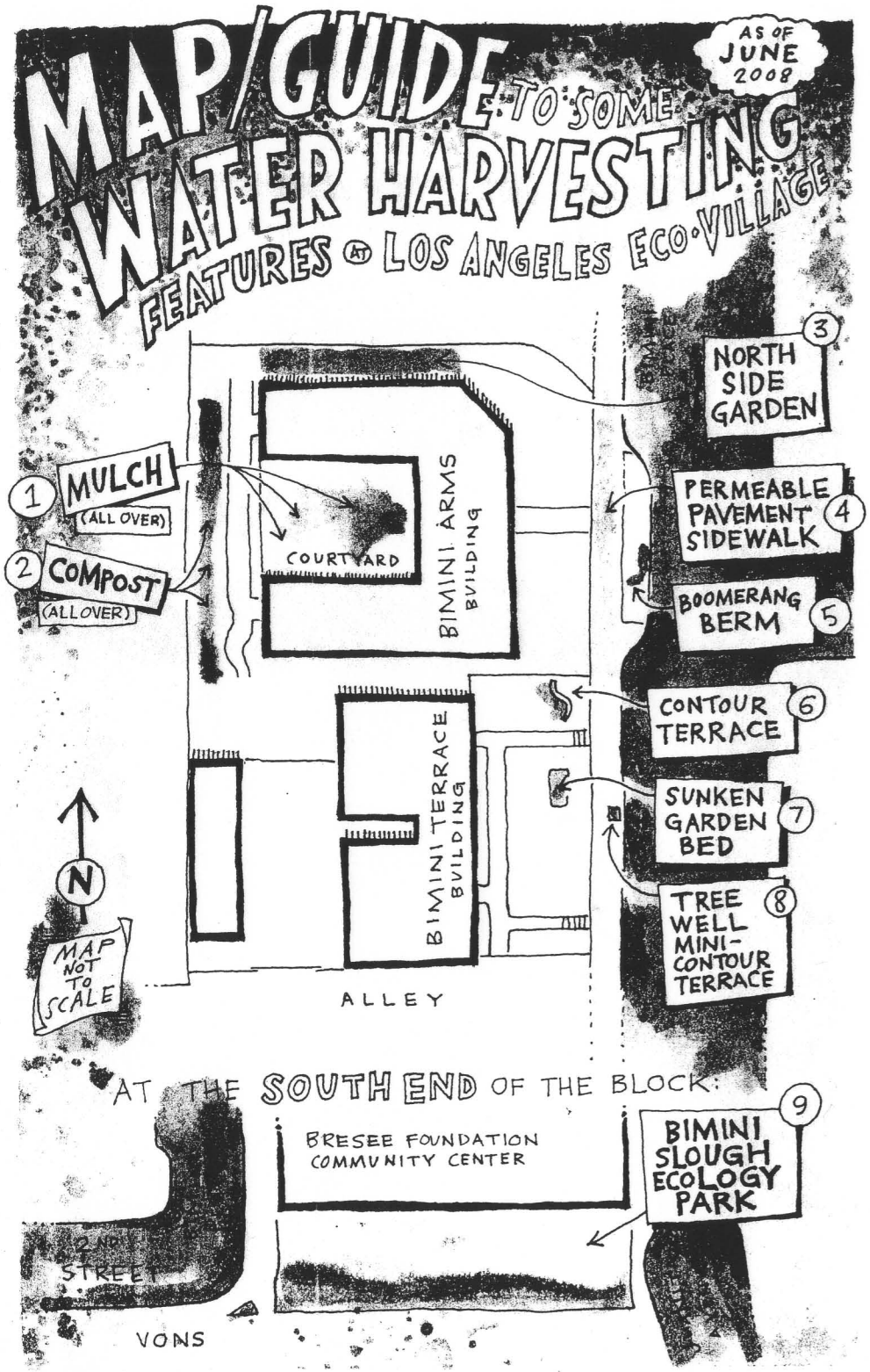
# INTRODUCTION TO LANDSCAPE RAINWATER HARVESTING

taught by Joe Linton
at the Los Angeles Eco-Village
117 Bimini Place, Los Angeles www.laecovillage.org
Saturday June 14th 2008

part of the
CRSP Institute for Urban Eco-Villages
Hands-On Urban Permaculture Workshop Series

booklet written and illustrated by Joe Linton
photocopied in an edition of approximately 25

Special Thanks to:
Lois Arkin, Dore Burry, Dale Kreutzer,
Lara Morrison, Ali Rosenblat, and Federico Tobon




1. **Mulch** – We generate some of our mulch locally from fallen leaves and tree-trimmings, but we also have tree-trimming companies drop off chipped wood. Mulch keeps the soil from drying out and prevents (most) weed growth. Keep it a few feet from buildings to discourage termites.

2. **Compost** – We compost food leftovers, plant trimmings, and sometimes horse-stable waste we pick up from stables in Los Feliz. Compost can be added to the top of soil, or mixed in.

3. **Northside Garden** – This area formerly had a barren slope and concrete walkway, both of which shedded water quickly. We broke up the concrete and used it to form a small retaining wall and stepping stones. Water collects and seeps into the ground nourishing a garden of shade-loving native plants.

4. **Permeable Pavement Sidewalk** – Part of a City-constructed "Shared Street" project, sidewalk was replaced with a permeable pavement made out of concrete and stone aggregate.

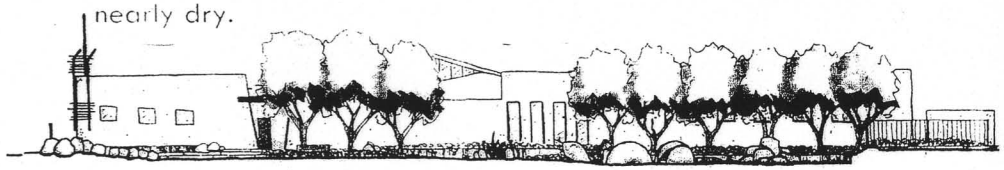
5. **Boomerang Berm** – Small contour berm created to focus rainwater for macadamia nut tree. (Temporary – we plan to rework this bulb-out area – also part of the "Shared Street")

6. **Contour Terrace** – Small terrace made of broken concrete, detains water that would run off sloped portion of garden.

7. **Sunken Garden Bed** – Sunken garden bed detains and infiltrates water.

8. **Tree Well Mini-Contour Terrace** – Level single-brick layer creates level terrace, focusing water for apple tree and wildflowers.

9. **Bimini Slough Ecology Park** – Former street area, unpaved to create park. Street rainwater runoff flows through vegetated creek "bioswale" area in park. Vegetation slows water, settles and breaks down pollution. During the dry season, the creek is nearly dry.



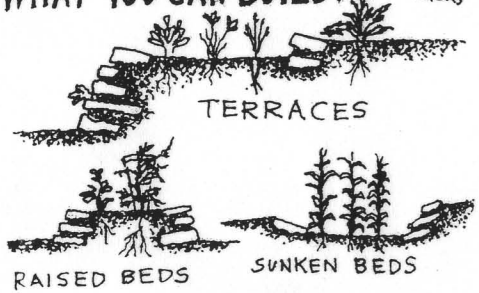
Bimini Slough Park rendering by North East Trees

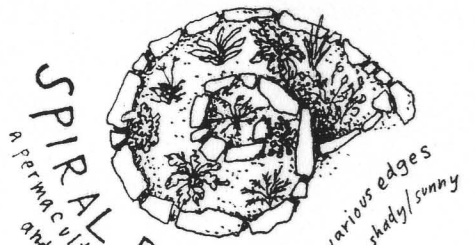
# some TIPS on building with URBANITE

## that's BROKEN CONCRETE

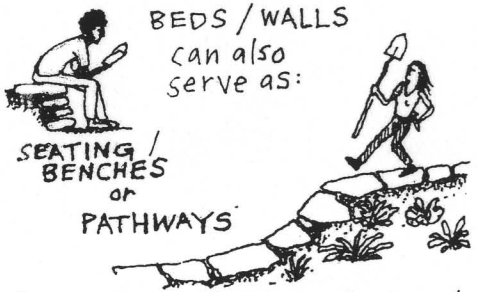
Thanks to **Larry Santoyo** who taught me a lot of this at a work party building spiral gardens at Proyecto Jardín.

### WHAT YOU CAN BUILD: some ideas



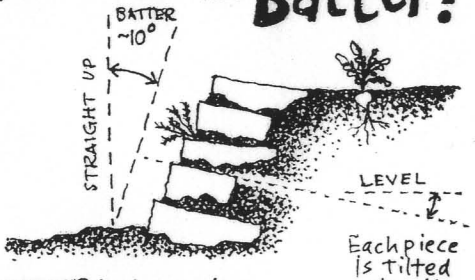




### STACK USES!




Set aside some big pieces for these!

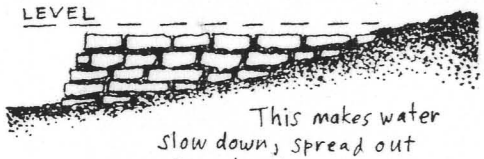
### DON'T FORGET the Batter!




BATTER is the angle off from straight up. It should be about 10 degrees off. That's about 12:01 or 12:02 on a clock. This makes the wall more stable.

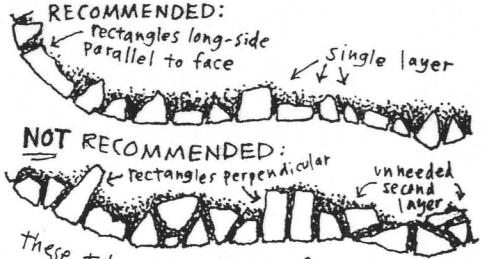
Each piece is tilted slightly toward the planting bed. This helps retain water and is especially needed when you plant in the wall.

### Keep the top LEVEL!




This makes water slow down, spread out and infiltrate. Use a level.

### BIRD'S EYE VIEW




These take away soil space from plants' roots

# Plants in your urbanite wall

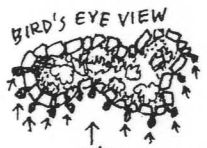
Generally use hardy perennials that grow to less than one foot tall.

**THYME** -
Many varieties! My favorite is the low groundcover. Slow growing.

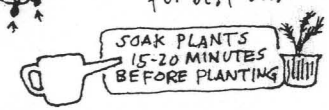
**YARROW**
One of my favorite plants! Native, low water. Attracts beneficial insects and more.

**OREGANO**
Many varieties! Very hardy, but can spread.

Others that I've been thinking of trying:
STRAWBERRIES, ALYSSUM, GARLIC CHIVES, PEPPERMINT, SPEARMINT, MARJORAM, SMALL SUCCULENTS... experiment!

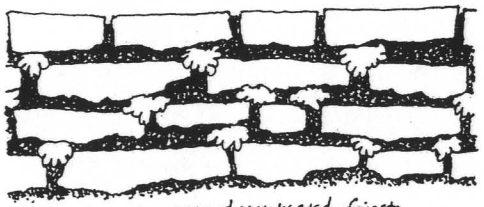



Plant sun-loving plants on south facing areas for best sun.



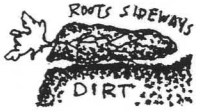

### WHERE TO PLANT:

place above gaps between pieces...

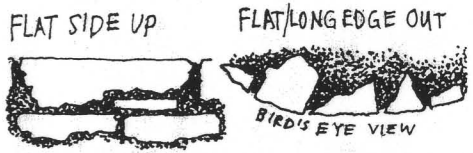


so roots can grow downward first:

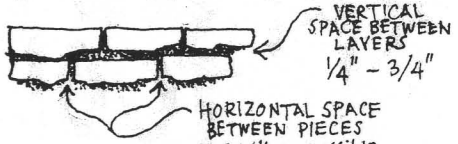
First fill gap with dirt, then place plant on top, roots sideways.




### easiest to work:

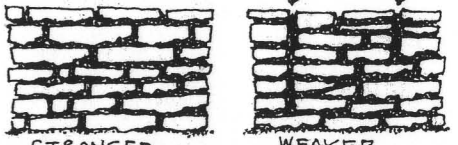



### SPACING

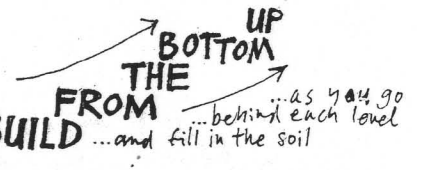



### AVOID RUNNING JOINTS

These weaken the wall...




...and they don't look as good.




You can use mortar (cement) between the urbanite pieces... but it's more work, more cost (financially and environmentally), and more permanent. Unmortared urbanite is flexible - easy to move around, modify, repair, re-do as needed.

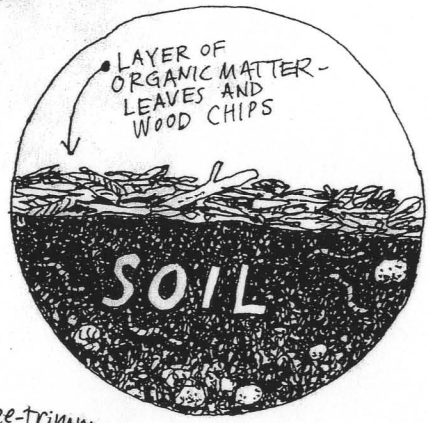
Longer, larger terraces that will collect a lot of water should include a **spillway** to focus overflow water - See Brad Lancaster Rainwater Harvesting - Volume 2 Water-Harvesting Earthworks - for details.

USE IMAGINATION! START SMALL!

# URBAN LANDSCAPE RAINWATER HARVESTING TOOL BOX

## ① MULCH

**L.A. ECO-VILLAGE ♡ MULCH**

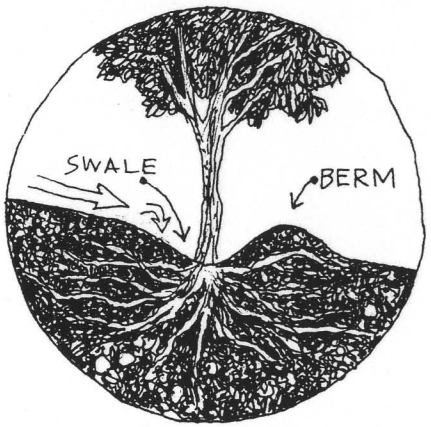



Mulch allows water to soak into the soil, then helps prevent it from evaporating. It breaks down gradually, nourishing the soil below. Get free mulch from tree-trimmers.

- add mulch to the surface of all rainwater harvesting earthworks.
- mulch inhibits plant growth - good for retarding weeds, but can make it difficult to start good seeds. Spread mulch after plants get going.

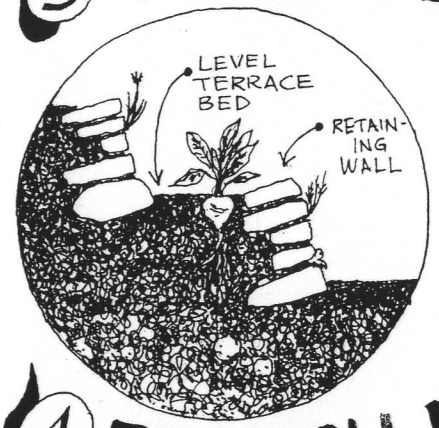
## ② SWALES/BERMS

A swale is basically a trench - when it's level (placed along a contour) it spreads water out, slows it down, and infiltrates it into the ground




- for sloped sites
- do "boomerang berms" around trees
- top of berm can serve as pathway

## ③ TERRACES



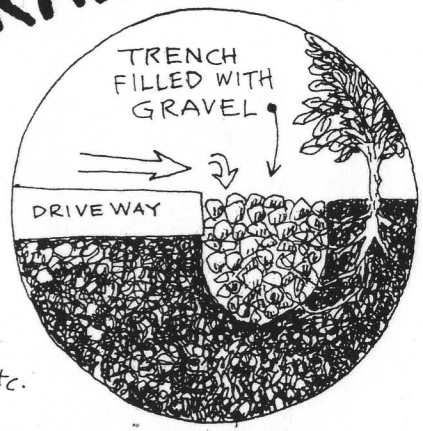

Terraces are a series of steps that level out sloped sites.

- for sloped sites
- top of retaining wall and planting bed should be level.
- They look great in your garden!

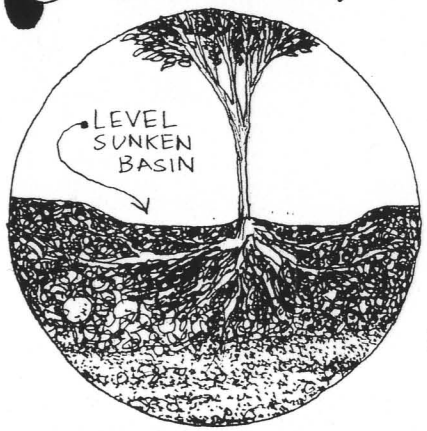
## ④ FRENCH DRAINS

Basically a trench that's filled in - so you can walk on it - but it still drains/infiltrates.

- for smaller areas especially where you don't want to change the profile.
- many variations - pipes, vaults, etc.




## ⑤ BASINS/SUNKEN BEDS




Usually a depressed ring area around a tree - allows water to settle in (collects organic matter, too.)

- for flatter areas
- bottom must be level

FOR WAY MORE DETAIL, SEE THE BOOK: RAINWATER HARVESTING - VOLUME 2 BY BRAD LANCASTER

# SOME BASIC GUIDELINES

## for urban landscape water harvesting projects

Adapted from Brad Lancaster's *Rainwater Harvesting for Drylands* (*Volume 1 Guiding Principles* and *Volume 2 Water-Harvesting Earthworks*) and Toby Hemenway's *Gaia's Garden: A Guide to Home-Scale Permaculture*. See these books for more information.

## DO

**1. Mulch and Compost**

In a healthy river system, the amount of water in the earth is about 15 times the amount of water flowing in the channel. Healthy soil acts like a sponge, absorbing water and gradually releasing it. We should learn from nature and store our water in the soil itself.

Compost goes in your soil; mulch goes on the top of it. Adding compost to soil helps it to retain moisture and acts as a natural fertilizer for plants. Mulch added to the top prevents evaporation and weed growth, and gradually breaks down into compost.

**2. Start at the Top**

For river restoration and for backyard-scale projects, the best results are achieved by starting at the highest point of your watershed and working your way down. Build swales, basins, cisterns and other features so that when they overflow, they feed into each other. Water stored uphill can be gravity-fed into features below. Multiple small features throughout the landscape are more resilient than a large feature at the bottom. If you don't start at the top, you're more likely to have larger flow that could overwhelm your work.

**3. Start Small**

You'll learn a lot from actually building and observing water-harvesting earthworks, so it's better to get something small in the ground soon and see what works for your site. You can always rework and add to it. Multiple small projects better mimic the resilience of a natural system. Singular monumental projects can fail dramatically, while a series of small projects are more resilient as when one fails, many others will keep working.

**4. Use Contours to Detain, Spread and Infiltrate Water**

Urban watersheds in general, and Los Angeles in particular, tend to be very impermeable. Los Angeles' impermeable surfaces rush stormwater off of our landscape, sending it out to the ocean as quickly as possible. A Los Angeles raindrop hits a rooftop. It rushes down the downspout onto a concrete driveway. From there it goes into the gutter, then into a storm drain, down a concrete-lined creek, and into the Pacific Ocean. This system generally prevents flooding, but is detrimental to water supply, water quality, soil fertility, and habitat. We flush away local water, and then pay heavily to import water from other places.

In order to restore watershed health, we need to slow that water down and allow it to soak/infiltrate into the ground. Permaculture's basic tool for slowing water is called a contour swale – shaping the earth to slow down the flow of water.

## DON'T

**1. DON'T infiltrate within 10 feet of buildings**

Water travels laterally underground and can undermine structures. Additionally, wet soil provides habitat for termites.

**2. DON'T allow standing water**

Standing water can rot plants and breed mosquitoes. It also evaporates more quickly than water stored in the ground. Make sure earthworks are not so monumental that they pond. Avoid compressing the soil (don't walk in/on your infiltration area) and use compost and mulch to make it absorbent.

**3. DON'T infiltrate on steep or unstable slopes**

Infiltrating water on a slope can undermine slope integrity and cause hillsides to collapse. Consult an engineer or other expert for hillside areas. Some sites are only appropriate for water capture and re-use (ie: cisterns, rain barrels, etc.)

**4. DON'T disturb relatively healthy intact ecosystems**

If you're lucky enough to have a larger site with natural areas, perhaps even a drainage or a stream, it may be tempting to harvest that water. Better to leave the stream flowing and harvest water "upstream" - before it reaches your drainage.

**Some Recommended Further Reading**
(listed in Joe's highly subjective order of usefulness for the Los Angeles urban water activist)

RIVER & WATERSHED ACTIVISM

***The Los Angeles River: Its Life, Death, and Possible Rebirth*** by Blake Gumprecht – a great read, excellent history, lots of pictures, maps – I learned a lot about the history of LA from this book.

***Totem Salmon*** by Freeman House

***The Riverkeepers*** by John Cronin and Robert F. Kennedy Jr.

***Down By The Los Angeles River*** by Joe Linton – guide book for exploring the mighty Los Angeles!

WATERSHED MANAGEMENT

***Second Nature: Adapting LA's Landscape for Sustainable Living*** by TreePeople – designs for retrofitting LA sites

PERMACULTURE

***Gaia's Garden: A Guide to Home-Scale Permaculture*** by Toby Hemenway – good useful basic small-scale permaculture for your own garden.

***Permaculture: A Designers Manual*** by Bill Mollison – the exhaustive permaculture bible!

RAINWATER HARVESTING

***Rainwater Harvesting for Drylands*** *(Volume 1 – Guiding Principles and 2 -- Earthworks, so far)* by Brad Lancaster – these are the best rainwater books – step by step instructions, illustrations and diagrams - buy them!

***The Urban Homestead*** by Coyne and Knutzen -- good easy-to-use guerilla basics for landscape, greywater, and cisterns – read their blog at homegrownevolution.com

***Rainwater Collection for the Mechanically Challenged*** by Banks and Heinichen – clear, well-written, all about collecting rainwater in cisterns.

***Design for Water*** by Heather Kincaid-Levario

*Leaning willow tree in the LA River*