



THE METROPOLITAN WATER DISTRICT
OF SOUTHERN CALIFORNIA

how to make a rain garden



Ingredients:

- YOUR SITE PLAN
- SHOVELS & RAKES
- COMPOST, WORM CASTINGS
- LIVING WOODCHIP MULCH
- HOSE WITH SPRAY NOZZLE
- SWALE PLANTS (see #7 below)

Call DIG ALERT (811) at least two days before digging to locate underground utilities!

- ① Get to know your rain. Make your site plan and note where rain falls, and how it flows. Look for an open, mostly flat low spot to direct water towards in the front yard, or anywhere with the center at least 10' away from the foundation of the house and 3' away from the sidewalk. Calculate the best size of your rain garden (see p. 2).
- ② Lay out your rain garden. Spread out a garden hose to outline the shape. The area must be basically flat or slightly bowl-like, and not sloping back toward the house. Be careful around trees. Don't put your rain garden under a mature tree or disturb any big roots. Remove all plants (including grass) from the area and start digging.
- ③ Test how fast your soil drains. If you have compaction, try to break

through it with a shovel or a pitchfork.

- ④ Dig a basin that is between 6" and 12" deep at the center. Slope the sides gently to make a sloping bowl, not a cylinder. Mound extra soil around the bowl to increase capacity. Put down at least an inch of compost or worm castings to activate your soil.
- ⑤ Direct downspouts into the basin area, moving the rainwater through gravel lined ditches or above-ground drainage pipes. Also, make an overflow path so extra water has a direct channel to the street and not back towards your house.
- ⑥ Plant swale plants in compost on the bottom. On the mounded sides, choose plants that like their feet drier. When it rains, the basin will fill up, creating a temporary pond until the water soaks into your soil. All the water should be gone in 24 hours. Make sure to mulch (2-3" deep) around your plants.
- ⑦ SWALE plants are special. They can be completely submerged in rain water and still survive our hot dry summers without extra water. They're sort of plant Super Heroes that way!

rainwater capture basic math

If you want to figure out how large your rain garden should be, use this basic calculation.

Gallons of Water ÷ 7.48 = Square Feet of Rain Garden (at 12" deep)

For example, to capture 620 Gallons, how big should you dig?

620 Gallons ÷ 7.48 = 83 Sq. Ft. area (at 12" deep)

620 Gallons ÷ 7.48 = 166 Sq. Ft. area (at 6" deep)

If your rain garden (aka swale) is 10' wide and 8-1/2' long, its area (10' x 8.5') is 85 square feet. So at 12" deep, it will hold about 620 gallons of rainwater. If you dig it down just 6" deep, your rain garden will hold only half of that, or just 310 gallons of water. With shallower swales, you may want more, or wider rain gardens. If you make your swale deeper, you can capture more water in a smaller footprint.

HOW MUCH WATER RUNS OFF THE ROOF?

The shape of your roof doesn't matter. A pitched roof and a flat roof have the same footprint and the same amount of rain falls on the area no matter its shape. Just measure the outside edges and calculate the area.

Area = length of side a x length of side b

For complicated roofs, divide into squares then add up the area of each square.

**Rainfall (in inches) x Square Feet x .62 =
Gallons of Rain Water**

If your roof is 1,000 square feet here's how much water runs off it:

1" (rainfall) x 1,000 (sq. ft.) x .62 = 620 gallons

5" (a big storm) x 1,000 x .62 = 3,100 gallons

15" (one year's total rainfall) x 1,000 x .62 =
9,300 gallons

It adds up quickly, even in dry areas. Try to save as much as you can in your garden!

HOW MUCH WATER COMES OUT OF ONE DOWNSPOUT?

Imagine the water from your roof splits into two downspouts.

Your Roof Area is 20' x 40' = 800 sq. ft.

If half of the water goes into each downspout, then the roof size for one downspout is:

800 sq. ft. ÷ 2 = 400 sq. ft.

Now calculate how much water that is in gallons.

400 sq. ft. x 1" x .62 = 248 gallons

**(of water, per inch of rain, from each
downspout).**

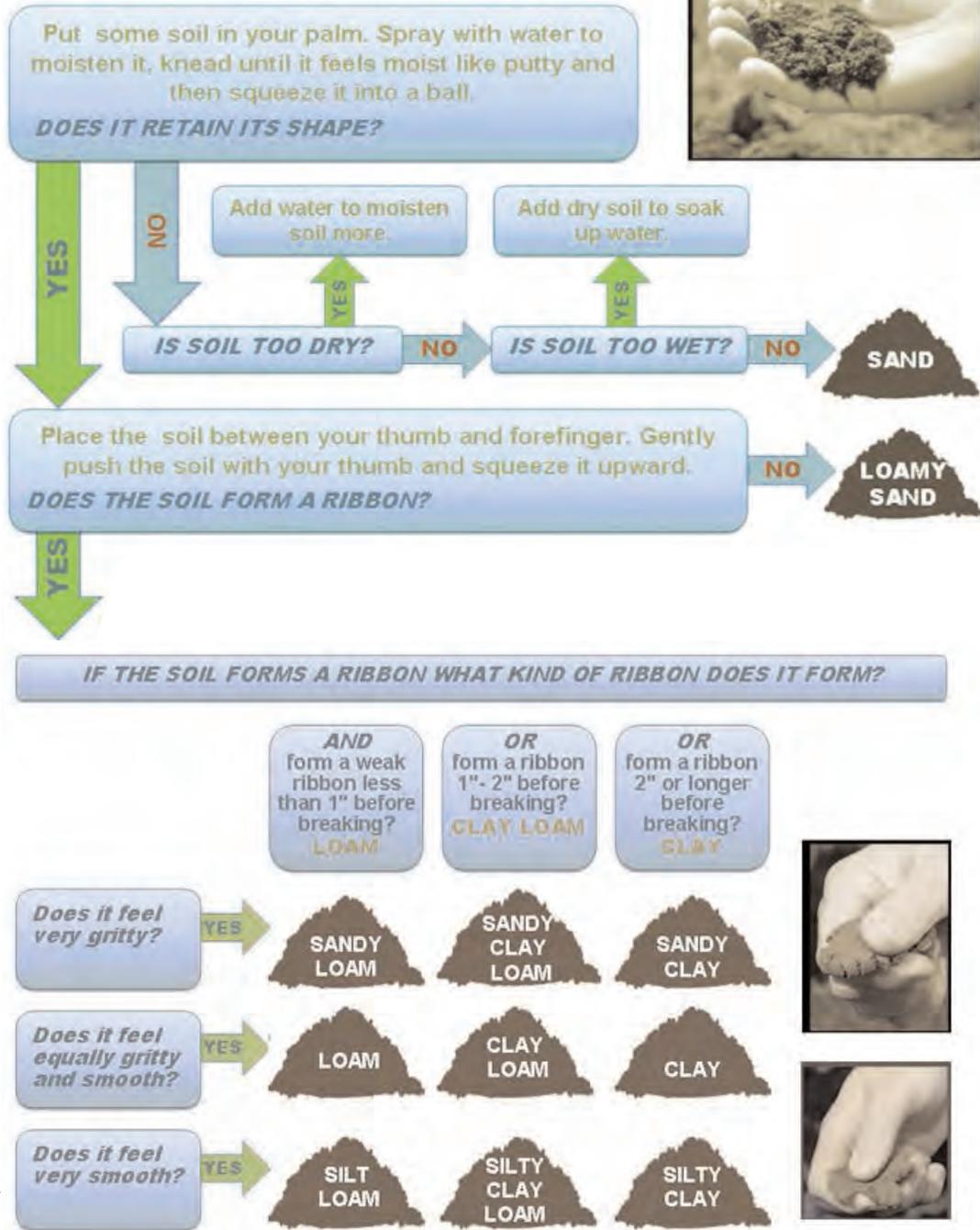
You can use these calculations to determine how much water comes off of any hard surface (patio, driveway, roof, sidewalk, etc.).



check your soil type

(an easy way to figure out your soil type)

SOIL TEXTURE BY FEEL



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making the sponge

So how do I change a BRICK into a SPONGE? Living soil remediation is the answer. It's not fertilizer, but it is food for the soil. When that food is digested by the organisms, it becomes food for the plants!

LIVING SOIL REMEDIATION

- ① **ADD OXYGEN** by opening up the soil. Once the spongy soil structure has been created, you will not want to break up the soil again. But to get things started, you must break a few eggs --- or break a little soil. You can rototill it, auger it, or dig it up with a shovel (or jackhammer!). Sometimes all it takes is a pitchfork plunged into the ground and pulled back and forth.
- ② **ADD WATER and LIFE.** You can add good compost, worm castings, and/or compost tea. All of these are full of the living microbes that will do the hard work of bringing your soil back to life. Spread them on, give them some water, and then...
- ③ **FEED YOUR SOIL ORGANISMS (not your plants)!** They like to eat organic matter, so give them a nice thick blanket of mulch (3" at least). Add water as needed, and your soil will be healthy and happy in no time, ready for your plants!



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join the soil party! Living soil is alive. A teaspoon of good garden soil contains billions of invisible bacteria, several yards of equally invisible fungal hyphae, several thousand protozoa and a few dozen beneficial nematodes.

“soil lasagna” recipe

(aka Sheet Mulching to Remove Turf)

- SHOVELS & RAKES
- BINS FOR REMOVED GRASS AND SOIL (WARM SEASON TURF GRASS ONLY)
- LANDSCAPE FLAGS
- COMPOST OR WORM CASTINGS
- MULCH (FRESHLY SHREDDED TREE TRIMMINGS WITH LEAVES ARE BEST)
- PAINTERS PAPER OR BIG SHEETS OF CARDBOARD (IT SHOULD BE CLEAN)
- HOSE WITH SPRAY NOZZLE
- WATER (LOTS!)



- ① Deal with the turf grass you have. If it's cool season turf grass (stays green all year), say goodbye, give it a good soaking of water and go to Step 3.
- ② If it's the other kind of turfgrass (any mixture that turns brownish in the winter) remove and dispose of soil at least 8” deep, but preferably 10” or more to be sure it’s all gone. If you can’t hand remove, rent a sod cutter.
- ③ Dig back 12” - 24” from any hard surfaces and building foundations to a depth of 8” - 10.”
- ④ Flag all your sprinkler heads so you can find and adjust or remove them later.
- ⑤ Add LIFE! Spread out a 1” deep blanket of compost or worm castings.
- ⑥ Water the soil so the paper will stick to it.
- ⑦ Roll out paper or cardboard. Be sure to overlap all edges by at least 6” - don't leave any bare soil! If necessary, to prevent tearing and gaps, use two layers of paper.
- ⑧ Water well - really soak the paper/cardboard.
- ⑨ While the paper/cardboard is wet, gently rake out a thick blanket of mulch (4” to 6”) over everything. Keep watering while you do this - you want the mulch to be really wet at first.
- ⑩ Admire your work.

That's it! Now the LIFE you added will get to work, turning it all into delicious, healthy living soil. When you're ready to plant, just dig a hole right into it, cutting through the paper/cardboard (if it's still there) and plant right into the yummy soil.

right plant right place

NOW THAT YOUR SOIL IS HAPPY you are ready to plant! It's almost as easy as digging a hole, but a little extra love will help. By following these simple steps, you will get your plants' roots growing properly, quickly spreading into the living soil and making friends with the other drought tolerant plants. Strong roots make strong plants, and this is especially important in dry environments.

successful planting recipe

Ingredients:

- **TOOLS:** shovel, hand trowel, hose
- **PLANTS • COMPOST • MULCH**

*Feeling Adventurous? Try the more advanced planting approach in ⑤ and add these to your list: **MYCORRHIZAE** (not for grasses) **FISH EMULSION** or **WATER SOLUBLE HUMATES***

- ① **Dig a hole! Don't dig it any deeper than the rootball of the plant. Do dig at least a little bit wider than the plant to loosen the surrounding soil. If you accidentally dig too deep, be sure to put the soil back in and tamp it down firmly before moving on, to give your plant a solid base.**
- ② **Throw in some compost or worm castings no more than 1" deep - along the bottom of the hole. Never put mulch in a hole!**
- ③ **Fill the hole with water TWICE, and allow it to drain completely each time. This will take a long time, unless your soil is really sandy. Start digging the next hole, or take a break.**
- ④ **Submerge the rootball in a bucket of water until air bubbles stop bubbling up. It's probably easier**

to keep the plant in its container but ok if you take it out - just be careful with the delicate roots.

- ⑤ **Add fish emulsion or soluble humate to the water (follow label directions). Dust the rootball with a mycorrhizae inoculant (only if the plants are woody, so don't bother with the grasses).**
- ⑥ **Place plant in hole, make sure the root collar (that's where the roots join the stem or trunk) is a bit (1/2" - 1") higher than the surrounding soil/existing grade. This is super important because we don't want the plant to get choked by the surrounding soil.**
- ⑦ **Fill the hole with water one more time (this time with the plant in it) and let it drain completely.**
- ⑧ **Now fill the hole with the soil you dug out (not with fancy potting soil!), making sure the soil slopes away from the root collar. Tamp the soil down (use your feet, but be gentle) so the plant doesn't move around.**
- ⑨ **Don't create a bowl around the plant. Really! Your plant doesn't need it and it might make a moat that would drown your drought tolerant plant.**
- ⑩ **Water the soil all around the plant one more time, and deeply. And have a drink yourself!**

What's with all the water at planting time?

There are three reasons:

DRAINAGE If the water does not drain within an hour or so, it's probably not a good place to plant a drought tolerant plant until you fix the compaction.

SOIL PARTY By watering so thoroughly, you are waking up any microbes that might be in the surrounding soil.

PLANT SHOCK The major reason plants suffer from planting shock is that the dry soil around the new plants wicks water away from their rootball, sending the plant

into shock from which they never recover. By watering the surrounding soil, you reduce the probability of plant shock.

"Hey, where's the fertilizer?" you may ask. Dry climate gardens don't want nutrient rich (i.e. fertilized) soil. It could make them grow too fast, use too much water, or just make them weak and sickly. By following our living soil remediation instructions you've made healthy, living soil for your plants - just add rainwater and that's all these plants need! Really. Let the soil microbes do all the work to keep your plants strong, healthy, and continuously drought tolerant.