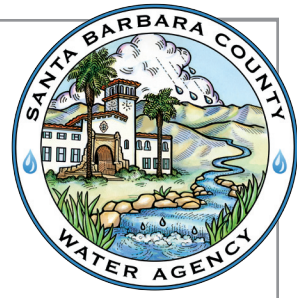




County of Santa Barbara Environmental Health Department
County of Santa Barbara Planning & Development Department
Santa Barbara County Water Agency



Simple Greywater Systems that Meet Commonsense Guidelines May Now Be Installed Without a Permit in Participating Water Service Areas in Santa Barbara County

v.1.0 June 22nd 2016

What Is Greywater?

Greywater is wastewater collected from showers, bathtubs, bathroom sinks, and clothes-washing machines. Greywater does not include water from toilets, kitchen sinks, or dishwashers. Greywater can be routed to your landscape to help meet your irrigation needs.

Why Irrigate with Greywater?

Irrigating with greywater conserves fresh water, extends the life of septic systems, improves the effectiveness of septic systems for treating toilet waste, reduces groundwater contamination from septic systems, and raises awareness of both indoor and outdoor water use. The simple systems described here also divert yard waste from landfills, increase tilth and soil fertility, and promote climate safety by reducing methane emissions from septic systems and landfills, as well as sequestering carbon via increased soil organic matter.

While irrigation with greywater provides a number of benefits, greywater does contain nutrients and bacteria that need to be considered. Mishandled, greywater can go “septic,” creating odors and nuisance conditions. This guidance is intended to assist the user to install systems that are relatively simple to install, will function easily with little risk of nuisance, and will comply with the conditions for a permit exemption.

What Requirements Must Be Met for a Simple Greywater System to be Permit Exempt?

An exempted system meets all the following requirements (based on CPC1602.1.2 (2)...*notes in italic are not part of the requirements*):

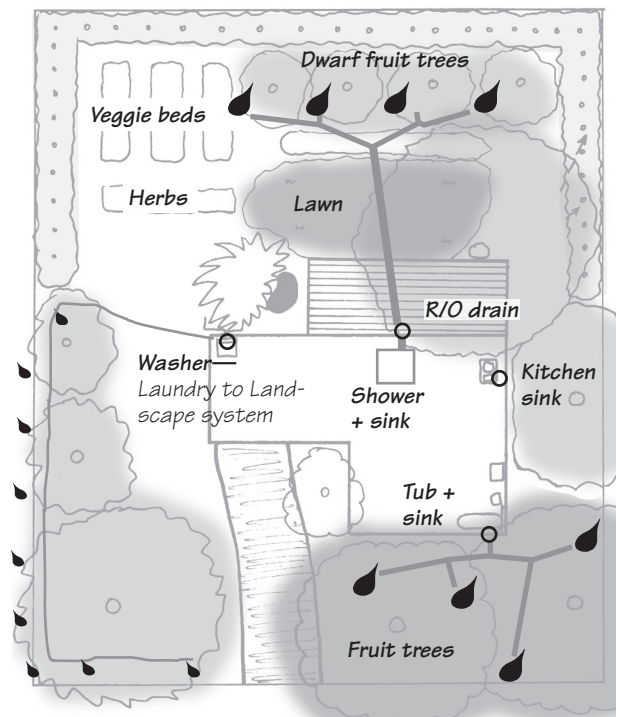


CITY OF SANTA BARBARA

Free wood chips are often available from tree trimmers. The City of Santa Barbara Water Conservation Program pays for mulch deliveries for customers to reduce evaporation loss and promote groundwater recharge.

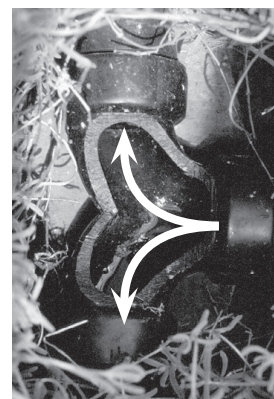
1. **You are within unincorporated Santa Barbara County and provide your own water or are supplied by a participating water purveyor**—Participating purveyors include Goleta Water District, Carpinteria Valley Water District, Montecito Water District, and San Marcos Mutual Water Company as of June 2016. Other districts may choose to participate; check WaterWiseSB.org for the current list. If your property is in any city other than Buellton, you need to contact your local building department regarding gray water system permitting.
2. **The greywater originates from a single-family dwelling with 4 bedrooms or fewer.**
3. **The system receives less than 250 gallons per day of greywater**—This will be true for most conserving households with fewer than 10 people.
4. **The system does not include a pump**—excepting the pump in a clothes-washer.
5. **The mulch basins or infiltration chambers receiving the greywater in the landscaped area are properly sized and designed so that there is no visible ponding, runoff, or septic odor**—The required area depends on the perk rate of the soil, and can be found in Table 1602-10, reproduced here for your reference.
6. **The greywater is contained in basins and covered by a minimum of 2 inches of mulch, solid outlet shield, or another method that provides equivalent separation.**
7. **The highest known seasonal groundwater level needs to be at least 3 feet below the surface**—This can be determined by digging or in consultation with the Environmental Health Department.
8. **The system does not include a potable water connection and does not adversely affect other building, electrical, or mechanical components**—for example, structural features, egress, fire/life safety, potable water supply piping, or accessibility.
9. **The greywater is contained on the site where it is generated.**
10. **Greywater contact with humans and domestic pets is minimized**—for example, by covering with mulch, and outlet shields.
11. **Greywater is used to irrigate plants such as trees or shrubs, not vegetables or surface irrigation of lawn.**
12. **Hazardous chemicals are not introduced into the greywater system**—for example, those derived from activities such as cleaning car parts, washing greasy or oily rags, or disposing of waste solutions from art studios or similar hobbyist or home occupational activities. Ideally the possibility of contamination is minimized by reducing or eliminating such substances from the site; though they can also be diverted to the septic/sewer, hazardous chemicals are not good for groundwater or ocean, either.
13. **Exemption from construction permit requirements does not grant authorization for any greywater system to be installed in a manner that violates other provisions of applicable**

SAMPLE GREYWATER DISTRIBUTION PLAN
WITH
LAUNDRY TO LANDSCAPE AND
GRAVITY-FLOW BRANCHED DRAIN SYSTEMS

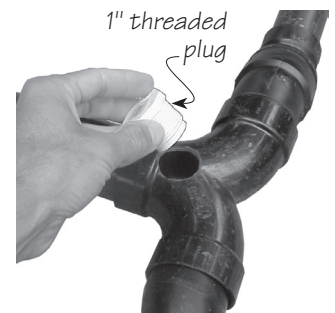


Darker shaded areas have greater irrigation need. Unshaded areas are irrigated occasionally or not at all.

- 2" GW distribution pipe
- 1½" GW distribution pipe
- 3-way diverter valve
- GW outlet
- 1" flexible HDPE greywater tubing



Cutaway view of a double ell, a flow-splitting fitting that is largely self-cleaning with no filtration.



A double ell retrofitted with inspection access. The access is sealed with a threaded plug.

codes or any other laws or ordinances of the enforcing agency—In other words, you still have to follow all codes even though you don't need a permit.

14. **An operation and maintenance manual is provided to the owner.** Directions indicate that the manual is to remain with the building throughout the life of the system and upon change of ownership or occupancy.
15. **Greywater piping conforms to the plumbing code and greywater best practices, including, for example:**
 - a) **Professional involved in the collection plumbing—the plumbing from the greywater sources to a point or points just outside the building—to ensure that traps and vents are positioned properly above the required diverter valve; that cleanouts are properly positioned; that pipes are sloped properly and will stay sloped properly; and that the proper fittings are used in the proper orientation to ensure the long-term smooth flow of solids through pipes in both greywater and septic/sewer modes. The landscaper/ greywater designer can help specify the point(s) and elevation just outside the house that collection plumbing should be routed to.**
 - b) **Diverter valve(s) for switching between irrigation and septic/sewer, clearly labeled and as accessible to the user as is feasible—This allows greywater to be diverted to septic/sewer as needed if use is high and/or weather is wet, or if toxic cleaners are used.**
 - c) **A backwater valve on all drain connections to the sanitary drain or sewer piping that are subject to backflow—This prevents sewage from backing up into the greywater system.**
 - d) **Greywater plumbing clearly marked as nonpotable where any possibility of confusion exists—for example, any greywater not in 1.25" or larger ABS should be marked with the words "CAUTION: NONPOTABLE WATER, DO NOT DRINK."**
 - e) **Greywater collection plumbing to a stub-out just outside the house is also permit exempt, provided the stub-out is permanently marked as nonpotable—for example, with the words "Greywater STUB-OUT, CAUTION: NONPOTABLE WATER, DO NOT DRINK." (Stub-out plumbing collection plumbing to a point just outside the house, where future distribution plumbing can be connected.)**

Mulch Basin Sizing:

Based on Table 1602.10

Design Criteria of Six Typical Soils

Soil type	Minimum square feet of irrigation/ leaching area per 100 gallons of estimated greywater discharge per day (required)	Maximum absorption capacity in gallons per square foot of irrigation/ leaching area for a 24-hour period	Gallons per outlet per day (suggested)
Coarse sand or gravel	20	5.0	25
Fine sand	25	4.0	20
Sandy loam	40	2.5	12.5
Sandy clay	60	1.7	9
Clay with considerable sand or gravel	90	1.1	5.5
Clay with small amounts of sand or gravel	120	0.8	4

What If My System Doesn't Meet All These Requirements?

Your system won't be exempt, but you can still get a permit for your system from the building department in most cases. If the system is for a bigger house or greater water flow, if it includes a pump, or if you want to do the collection plumbing yourself, the pathway to system success is a little trickier. In these instances the permitting process will help ensure that the system works satisfactorily for the long term.

Any More Advice?

Experience has shown that the best results are obtained if you—

1. **Have a landscaper experienced with greywater systems, or a greywater professional, help design the system**—If you want to install your own system or understand it better, seek out information on the topic online, or from the Environmental Health Department or the library. *Note to do-it-yourselfers: Search on the term “Branched Drain,” the most common gravity-flow solution for shower and sink water. Branched Drain greywater systems can be quite challenging to design and install well, more on par with building a shower than fixing a leaky faucet. Laundry-only systems are also permit exempt (CPC 1602.1.1) and are a better DIY project to start with (search “Laundry to Landscape”). If you find installing a laundry system easy, then you might be up for the design and installation challenge of gravity greywater systems Unlike cheap, small-diameter, flexible, drip irrigation or laundry-only systems, expensive, large-diameter, stiff, buried gravity-flow greywater irrigation piping must be supported by straps or soil and slope continuously downhill at a precise slope of 2%. It's not cheap or easy to get it where you want it to go or to change it. It's best if the trees to be irrigated are chosen and planted together with the design of the gravity greywater-flow system (note: fruit trees are generally the best plants to irrigate with gravity-flow greywater). The system can last for decades, so the design will ideally take into account factors such as tree growth, kids growing up and leaving home, changes in ownership of the house, etc. It's not an easy task, but one that is rewarded with decades of free water and happy trees. It's a great feeling to know that thirsty fruit trees are taking as much pleasure in your showering as you are!*
2. **Pay particular attention to the elevations of greywater outlets**—*Note to landscapers: Gravity greywater outlets usually perform best when as high as possible, up to 6” above the original soil grade, to leave clearance for mulch without clogging (more height than that is not needed). Note that it takes much more design effort, installation skill, and expense to get the outlets high in the landscape. The height and location of outlets will determine the performance, maintenance interval, installation challenge, and cost of your system. Note to plumbers with limited gravity-flow greywater experience: the extra effort and expense to plumb the collection plumbing high enough for unimpeded flow of solids out of the outlets at least 2” above the surface of the mulch is generally well worth it.*
3. **Have a professional involved in the collection plumbing**—the plumbing from the greywater sources to the point and elevation specified by the landscaper. It is legal to do your own plumbing; however, involving a professional at the outset will ensure that traps and vents are positioned properly above the required diverter valve, that cleanouts are properly positioned, that pipes are sloped properly and will stay sloped properly, and that the proper fittings are used to ensure the long-term smooth flow of solids through pipes in both greywater and septic/sewer modes. For example, a sanitary tee only works properly when oriented vertically, while a seemingly identical fitting—a combination tee-wye—is used in the horizontal plane. Properly designed collection plumbing should last the life of the house; having a professional eye on it from the start will save money and grief compared to hiring one later to repeatedly unclog or rebuild the drain plumbing. Which professional should you hire? Ideally a landscape contractor or plumber with extensive greywater-specific experience, as not all are familiar with greywater best practices. *Notes to plumbers: Standard good practice applies to greywater collection plumbing,*

apart from the need for a diverter valve in a reasonably accessible position. Despite the sharp angles, the three-way pool valves universally used have an astonishingly clog-free record in decades of service.

4. **Have a landscaper install the irrigation piping, shape mulch basins, and plant trees**—*Note to landscapers: **Plant the trees high.** Instead of digging a hole under them, dig a hole or holes adjoining, and surround the roughed-up root ball of the tree with a cone of dirt from the holes, which can be backfilled with compost or wood chips. The basins should be bigger and deeper than standard horticultural basins. Here are some tips for making good basins:*
 - a) **Enough area**—to comfortably infiltrate greywater without the soil staying saturated more than 24 hours (see table, above).
 - b) **Enough volume to contain surges without overflowing**—To provide surge capacity within the basins to hold, for example, water from a rapidly drained bathtub, they should be able to hold 3–6” of water, with the basin walls 4” above the high-water line. The depth of water in the mulch basins should not exceed 6”, as this can lead to saturation, puts more pressure on basin walls, and increases the likelihood of leakage through gopher holes.
 - c) **Gopher protection**—*either wire in the basin walls to protect against leakage or thick mulch outside them to infiltrate incidental leakage.*
 - d) **Enough outlets**—that the area around the outlet is not over-saturated. See table above.
5. **Keep an eye on the system**—Wood chips need to be added annually to the basins, to a level at least 2” above the highest greywater level. If you can see or smell that the basins are waterlogged, you need to make the basins bigger, or divert the greywater to septic/sewer when use is high or conditions are rainy, or add more outlets. Don’t make basins deeper—that tends to make waterlogging worse.
6. **Check for rebates**—Many water purveyors offer rebates on greywater system components, including free or low-cost mulch.

These Systems Are a Key Part of Resource Custodianship for Our Future

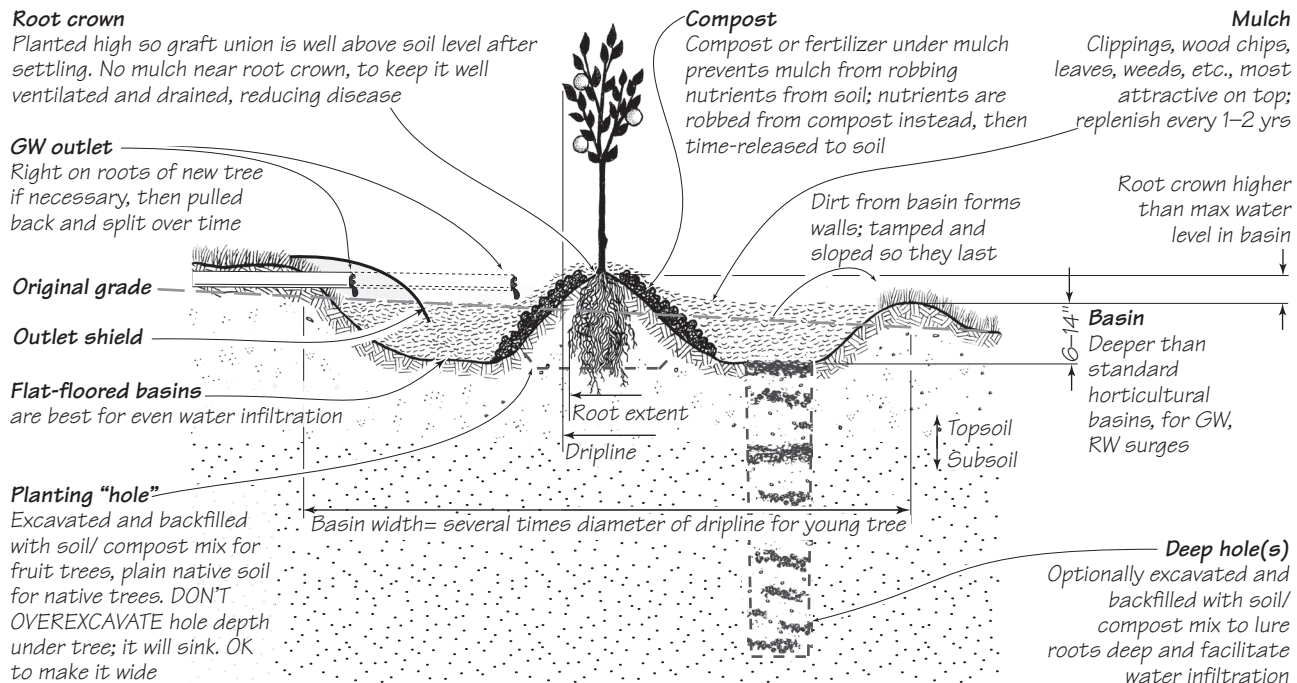
The Santa Barbara area has a history of international leadership in greywater irrigation innovation and regulation.

Greywater system design is the perfect residential systems thinking gateway. Greywater systems are relatively forgiving and safe, yet their design and use can go very deep: Of all “green” systems, greywater is both the most context-specific and the most interconnected with other systems. Greywater system design coordinates efficient fixtures, fixture use habits, plant- and soil-biocompatible cleaners, edible landscape plant selection and location, rooftop rainwater and surface stormwater management, mulch sources, gardening preferences, soil, slope, and sun.

With **very little effort** you can divert greywater and double the life and halve the maintenance cost of your septic system.

With **quite a lot of layers of thought and action** you can optimize and integrate all these functions—ending with, for example, a super-efficient washing machine that fills with soft rooftop rainwater and launders with a tiny amount of detergent, which biodegrades into plant food as it irrigates and nourishes strategically located trees, which in turn provide sheltered, shaded private outdoor living space, lowered cooling bills for the house, and fruit. The mulch basins can transform 100% of household green waste and yard clippings into fertile soil, reducing pressure on our landfills and climate.

STANDARD GREYWATER MULCH BASIN FOR NEW PLANTING



GREYWATER MULCH BASIN MAINTENANCE/ SAME TREE 30 YEARS LATER

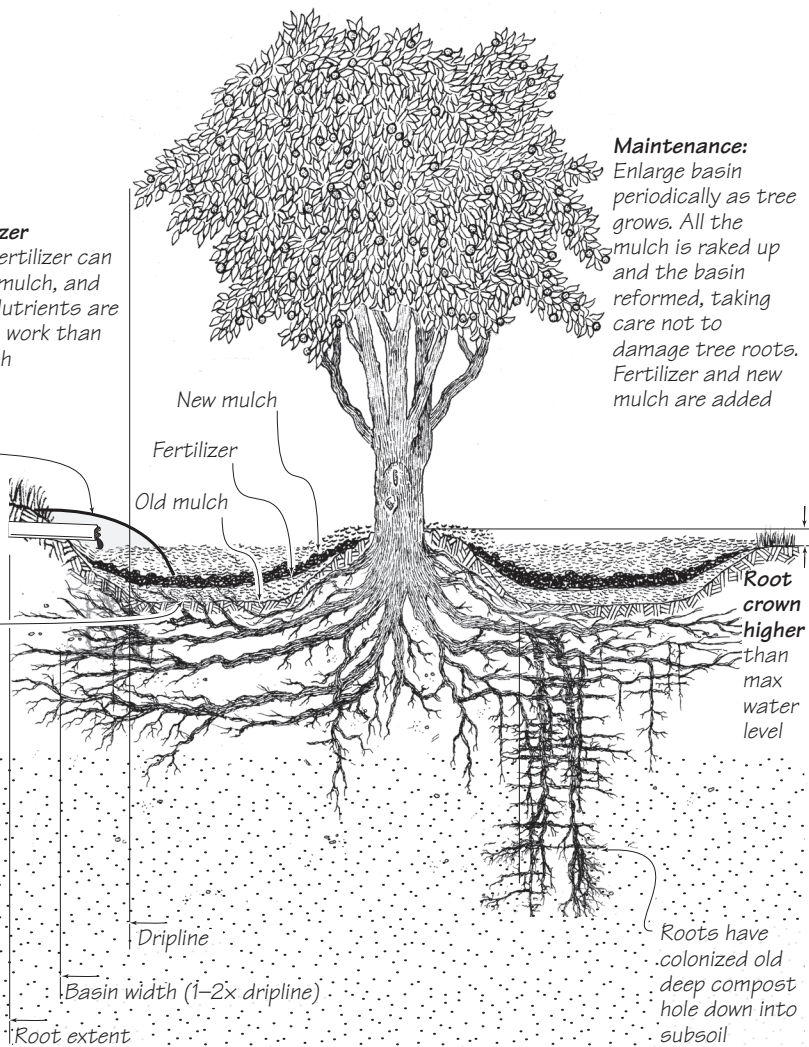
Layers of mulch and fertilizer

After the first year or so, fertilizer can be added on top of the old mulch, and new mulch tossed on top. Nutrients are time-released and it is less work than adding fertilizer under mulch

GW outlet has been pulled back and split into two outlets

Floor of basin is flat for even water distribution, higher capacity

Topsoil
Subsoil



Tips

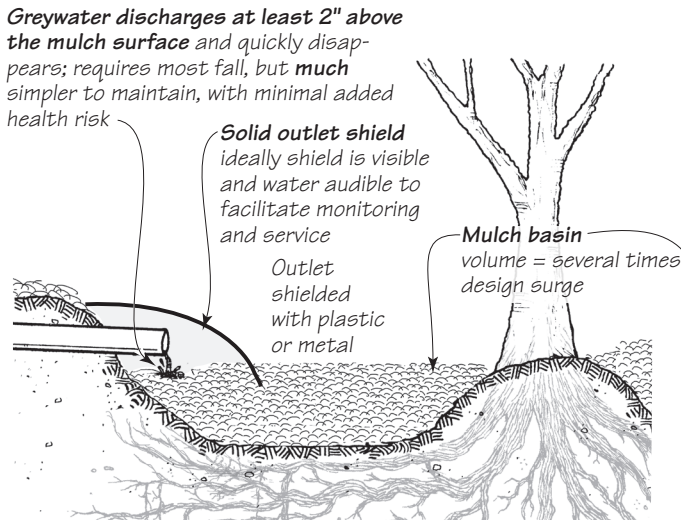
For greywater mulch basins compared to regular mulch basins for fruit trees:

- ❖ Basins should be deeper.
- ❖ Basins should be wider.
- ❖ Walls should be compacted water-tight by stomping or tamping.
- ❖ Mulch should be a thicker layer of woodier (i.e., more durable) material.
- ❖ Trees should be planted in taller islands.

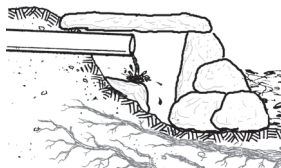
GRAVITY-FLOW BRANCHED DRAIN GREYWATER OUTLET OPTIONS (ELEVATION VIEW)

A: SHIELDED FREE-FLOW OUTLET (PREFERRED OPTION)

Shielded above-grade, above-mulch outlets are preferred whenever possible. They are far less clog prone, easier to find, inspect, and maintain. These can go for years w/o maintenance.



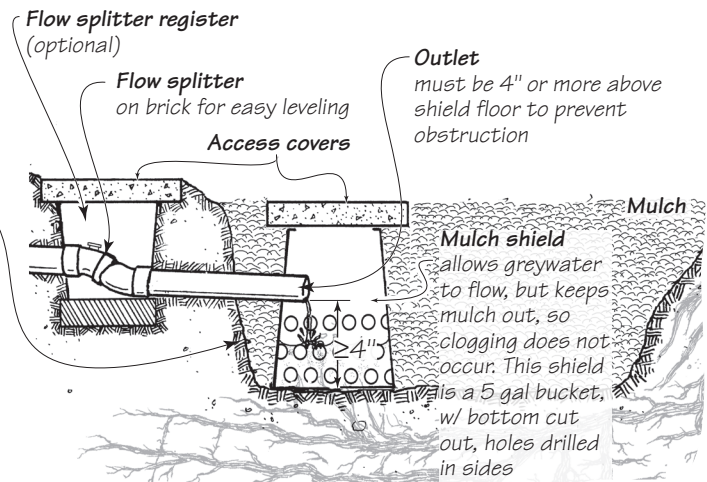
Outlet shielded with rocks



Subsoil infiltration chambers are the last resort, usually used in tight quarters, where they can be placed under pathways or outdoor living surfaces. They are by far the most costly as the entire infiltration capacity has to be in the chamber (expensive) versus in an open basin (cheap). This is compounded by the fact that the infiltration rate will be lower, as they can't easily be mulched inside to keep the soil open. Be sure to make them big enough, not overload them, put wire mesh under them so gophers don't backfill them with dirt, place them where they can be dug up for service if needed, and mark/ map them well.

B: SUB-MULCH OUTLET WITH MULCH SHIELD

Sub-mulch outlet shields are necessary when pipes are not high enough to do shielded free-flow outlets. These require removal of material from inside the shields at least annually.

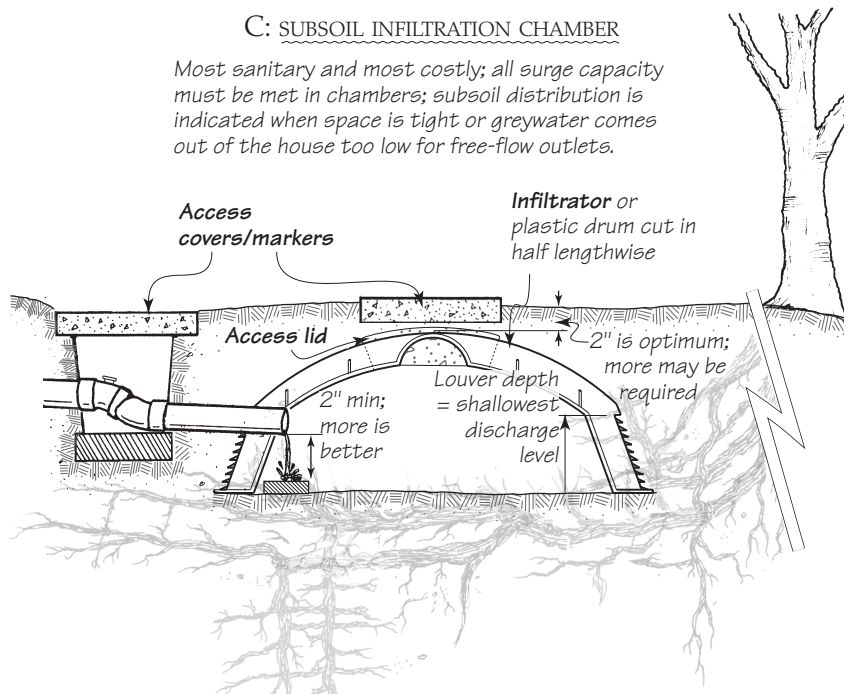


Avoid these common mistakes:

Don't make the outlet chamber too small. 3 gallons is the minimum size.
Don't surround them with soil; they require the rapid infiltration of mulch.

C: SUBSOIL INFILTRATION CHAMBER

Most sanitary and most costly; all surge capacity must be met in chambers; subsoil distribution is indicated when space is tight or greywater comes out of the house too low for free-flow outlets.



Contacts

For more information about greywater systems, call the Environmental Health Services Division of the Santa Barbara County Public Health Department at (805) 681-4900 in Santa Barbara or (805) 346-8460 in Santa Maria.

For plumbing permit requirements, contact Santa Barbara County Building & Safety at (805) 568-3030 for the South County Office or (805) 934-6230 for the North County Office.

Resources

Copies of the California Plumbing Code (CPC) Greywater Regulations Chapter 16 are available from this site:

<https://law.resource.org/pub/us/code/bsc.ca.gov/gov.ca.bsc.2013.05.pdf>

There is a wealth of information on the Web on greywater, though care must be taken to assess the quality of the information. Sample searches: “Laundry to Landscape,” “Branched Drain,” “Common Greywater Mistakes”

Funding Assistance

The Santa Barbara County emPower program offers property owners the opportunity to finance energy- and water-efficiency property improvements through the property tax system:

<https://empowersbc.org>

