



State of Oregon
Department of
Environmental
Quality

Graywater Reuse and Disposal Systems

Graywater Reuse and Disposal Systems for the Homeowner

Ashland Community Graywater Informational Meeting

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Ron Doughten, Water Reuse Program Coordination

Oregon Dept. of Environmental Quality

phone: 503.229.5472

email: doughten.ron@deq.state.or.us

Graywater Reuse and Disposal Systems

Overview

- Before you get started
- 9 steps to a DEQ graywater permit
- Resources & questions



Watch for keys to compliance!





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Graywater Reuse and Disposal Systems

Before you get started

State regulations **encourage** the reuse of graywater for **beneficial purposes** such as irrigation



Oregon's graywater program is a beneficial reuse program—not a disposal program



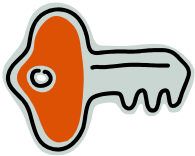
Oregon statute requires a person to obtain a permit from DEQ to construct, install or operate a graywater reuse and disposal system



Obtaining a permit requires thoughtfulness and planning

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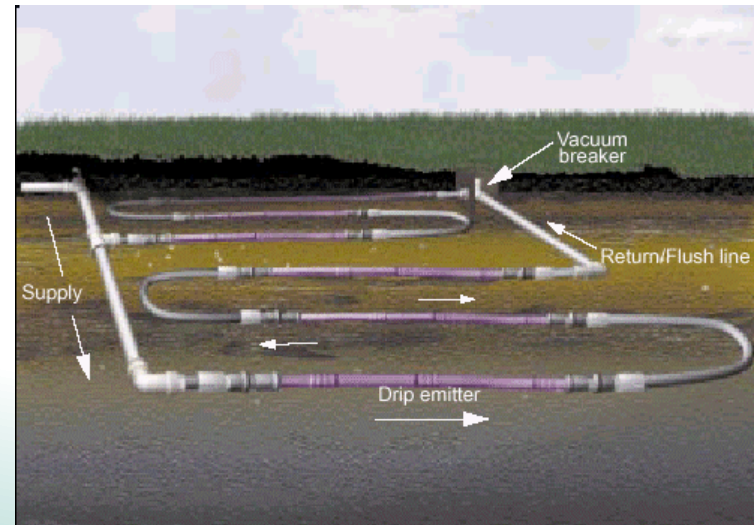
Step 1: Determine use



Uses of graywater include:

- Subsurface irrigation of:
 - gardens, lawns, and landscape plants
 - food crops, except root crops or crops that have edible portions that contact graywater
 - green roofs
 - compost
- Subsurface = 2" cover of soil, mulch or compost
- Graywater must be used within 24 hours (no storage)
- Graywater must not surface, pond, or runoff.

Type 1 graywater



Note: Although they are not discussed today, graywater can be used for other uses.

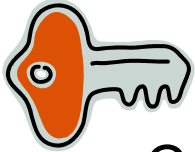
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Step 2: Pick a location

- Irrigation sites must not flood or receive large amounts of runoff at the time of irrigation
- Slope must be less than 45 degrees
- During the irrigation season, there must be at least 4-feet of vertical separation below the point of graywater release and groundwater
- **Soil** and **vegetation** must accommodate graywater
- Horizontal setback distances:
 - 100' to groundwater wells and springs
 - 50' to surface water bodies
 - 10' to stormwater structures
 - 2' to property lines



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Keep a written record of your site evaluation!

Create a site diagram or map with the following information:

- Total size of your property
- Area and location of graywater irrigation
- Location of “sensitive features” including surface water, wells, property lines

Know your soil

- Sand, silt, clay, loam, etc.

Describe vegetation

- High, medium, or low water usage

This is not a good graywater irrigation site →



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Step 3: Estimate your summer irrigation needs

– Method A: Water bill calculation

$$\text{Weekly irrigation (gal/wk)} = \frac{\text{Summer water use} - \text{Winter water use} \times 748 \times 7}{\text{Days of services for water bill}}$$

– Method B: Area and vegetation calculation

$$\text{Weekly irrigation (gal/wk)} = A \times ET_{lawn} \times k_s \times 0.62$$

As a rule of thumb, lawns require 1" of water per week during July and August.



You need provide the estimate on the permit application



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Step 4: Estimate your available graywater

Consider the sources of graywater you can “harvest”



Showers & baths

- Relatively clean
- Predictable volume and frequency



Bathroom sinks

- High conc. of personal care products
- Low volume



Laundries

- Predictable volume and frequency
- High conc. of lint/fiber
- Detergents can be hard on plants



Kitchen sinks

- “Dirtiest” source
- May contain high conc. of organics, solids, fats, oils, grease, bacteria
- Required physical treatment



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Estimating graywater flow:

$$\text{Graywater flow (gal/wk)} = \text{Flow per event} \times \text{events per week}$$

Example: Each person in a 3-person household showers 5 minutes everyday.
The showerhead is rated at 2.2 gallons/minute.

$$\begin{aligned}\text{Shower flow (gal/wk)} &= 2.2 \text{ gal/min} \times 5 \text{ min/day} \times 7 \text{ days/wk} \times 3 \\ &= 231 \text{ gal/wk}\end{aligned}$$



You need provide the graywater flow estimate on the permit application

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Create a water balance:

	Example A	Example B
Graywater supply	274 gal/wk	410 gal/wk
Water need (subtract)	100 gal/wk	569 gal/wk
Difference	164 gal/wk surplus	-159 gal/wk deficit
Design option	Reduce number of fixtures	Plan for supplemental irrigation

“Raw” graywater cannot be held for more than 24 hours.

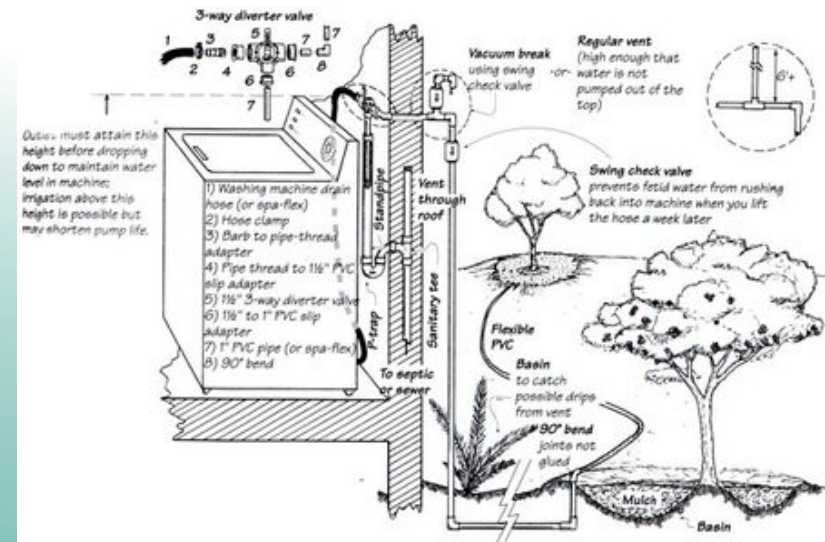
If you’d like to store excess graywater, your system design must include graywater treatment and storage, which requires a different DEQ permit (Tier 2, 2402 general permit).

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Step 5: Design your graywater system

Use your site specific data to **design** your graywater system

- Graywater **collection system** and plumbing
- **Diversion device**
- Physical **treatment** for kitchen sinks
- Surge **tanks**
- **Distribution** system
- **Irrigation** system
- Make the design clear and simple
- If necessary, use a professional to help



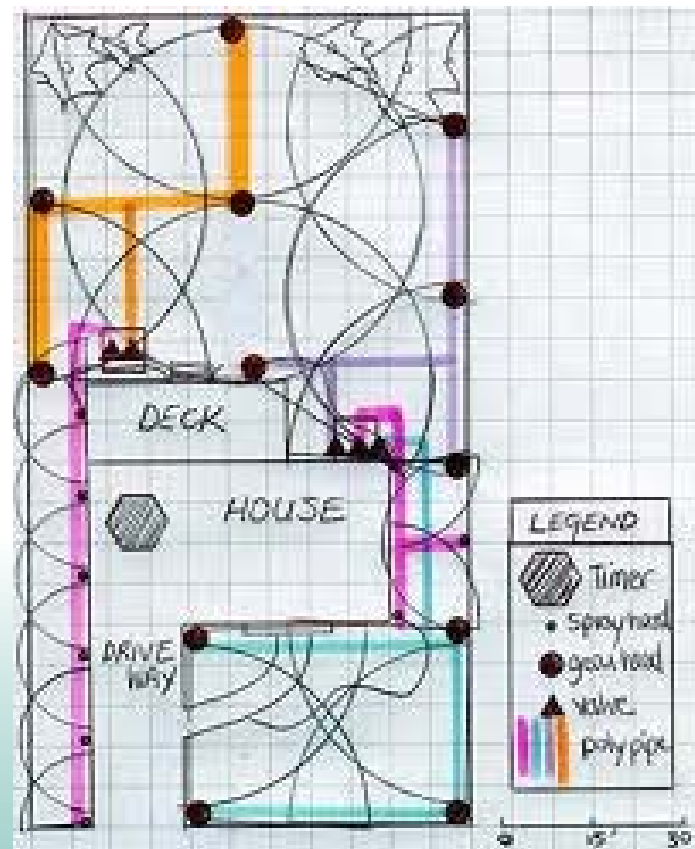
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Step 6: Document your system



System design plan

- Beneficial uses
- Location
- Design flow
- Fixtures
- Treatment
- Distribution and irrigation
- Name and contact information for designer

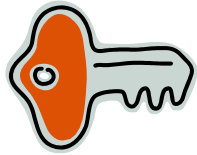


Note: You do **not** have to submit your system design plan to DEQ.



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Operation & maintenance manual

- A short “how-to” guide for your graywater system
- Routine maintenance (e.g., cleaning filters)
- Periodic maintenance (e.g., seasonal flushing)
- Turning the system on in the spring
- Shutting down the system in the fall
- Draining the irrigation system
- Operation of the diversion device

Note: You do **not** have to submit your O&M manual to DEQ.





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Step 7: Apply for your permits

- **Plumbing permits:** contact your local building department for plumbing requirements



- You need to list plumbing permits on your DEQ permit application

- **DEQ permit (Tier 1 2401 general permit):**
 - Pay the fees: \$90 (\$50 application fee; \$40 annual compliance fee)
 - Send in the application
 - Wait to receive notification (via email or postal mail) of coverage

The Tier 1 (2401) general permit is available **only** for single-family residences and duplexes with no more than 4 bedrooms that use graywater only for subsurface irrigation.



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Tier 1 (2401) general permit

The screenshot shows a web browser window displaying the application form for a Tier 1 (2401) Graywater Reuse and Disposal System WPCF General Permit. The browser's address bar shows the URL: <http://www.deq.state.or.us/wq/wqpermit/docs/general/wpcf2401/2401PermitApp.pdf>. The form is titled "Application for 2401 Tier 1 Graywater Reuse and Disposal System WPCF General Permit" and is issued by the State of Oregon Department of Environmental Quality, 811 SW 6th Avenue, Portland, OR 97204. The form includes sections for "For DEQ Use Only" (Date Permit Issued, File No., Date, Amount Received, Check No.), a registration requirement notice, and two main sections: "A. APPLICANT NAME AND CONTACT INFORMATION" and "B. GRAYWATER REUSE AND DISPOSAL SYSTEM INFORMATION". Section A includes fields for legal name, ownership, email, telephone, mailing address, city, state, and postal code. Section B includes a field for the location of the system (point of graywater generation) and a field for the street address.

For DEQ Use Only

Date Permit Issued _____

File No. _____

State of Oregon
Department of Environmental Quality
811 SW 6th Avenue, Portland, OR 97204

Application for 2401 Tier 1 Graywater Reuse and Disposal System WPCF General Permit

For DEQ Use Only

Date _____

Amount Received _____

Check No. _____

Registration is required for all proposed and existing graywater reuse and disposal systems. The applicant must provide all requested information for this application to be considered complete. An application that is incomplete or unsigned will be returned to the applicant to complete.

A. APPLICANT NAME AND CONTACT INFORMATION

1. Legal name of applicant: _____

2. Is the applicant the owner of the property? ☐ Yes ☐ No

3. ☐ Email: _____ Telephone: _____
☐ No email address or do not wish to correspond by email.

4. Mailing address: _____
City: _____ State: _____ Postal Code: _____

B. GRAYWATER REUSE AND DISPOSAL SYSTEM INFORMATION

LOCATION OF SYSTEM (POINT OF GRAYWATER GENERATION)

1. Street address: _____

**Send completed application
and permit fees to:**
Oregon DEQ
Attn: Business Office
811 SW Sixth Avenue,
Portland OR 97204

<http://www.deq.state.or.us/wq/wqpermit/docs/general/wpcf2401/2401PermitApp.pdf>



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Step 8: Install your system

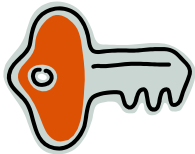


Photos from
*San Francisco
Graywater
Design Manual
for Outdoor
Irrigation*



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Step 9: Operate & maintain



Only use graywater when you need it:

1. If the plants need water, give them graywater
2. If graywater isn't enough, give them some fresh water
3. If the plants don't need water, send your graywater to the sewer or septic system

- <http://www.conserveh2o.org/outdoors/irrigation/weeklywateringnumber>
- Do not irrigate when soils are frozen or saturated



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- Avoid products that contain
 - Salts and sodium compounds
 - Boron or borax
 - Chlorine bleach
 - Harsh chemicals
- Send your graywater to the sewer when washing dirty diapers or similarly soiled laundry
- Do not eat plants or vegetables that have come in contact with graywater

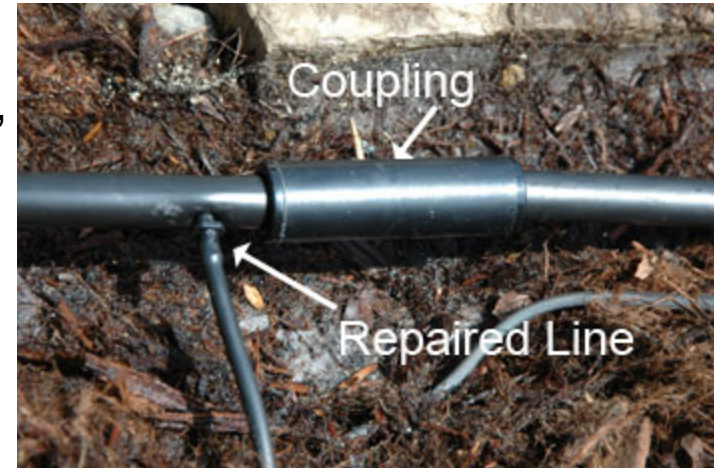




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- Visually check your system, look for leaks, breaks, or other problems
- Clean or change filters; remove solids, grease, etc. from the physical filtration system
- Check out mulch basins and irrigation areas and make sure that graywater isn't surfacing or running off
- Maintain mulch over graywater discharge points
- Check to verify that graywater discharge points aren't clogged or restricted
- If needed, flush the system or otherwise clean the system



Submit an **annual report** to DEQ

Renew your permit!



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Resources & Questions

DEQ website: <http://www.deq.state.or.us/wq/reuse/graywater.htm>

- Reusing Graywater in Your Landscape: A Guide for Oregon Homeowners
- Questions and Answers: Permits for graywater reuse and disposal systems
- Permit applications

Not all the following information can be used in Oregon

Regional Water Providers Consortium:

<http://www.conserveh2o.org/>

Agrimet (irrigation and water use):

<http://www.usbr.gov/pn/agrimet/h2ouse.html>

Washington Graywater program:

<http://www.doh.wa.gov/ehp/ts/ww/greywater/greywater.htm>

San Francisco Graywater Guide:

<http://sfwater.org/modules/showdocument.aspx?documentid=55>

Greywater Action: <http://greywateraction.org/>

Oasis Design: <http://oasisdesign.net/>

Graywater Gardening: <http://www.graywatergardening.com/>





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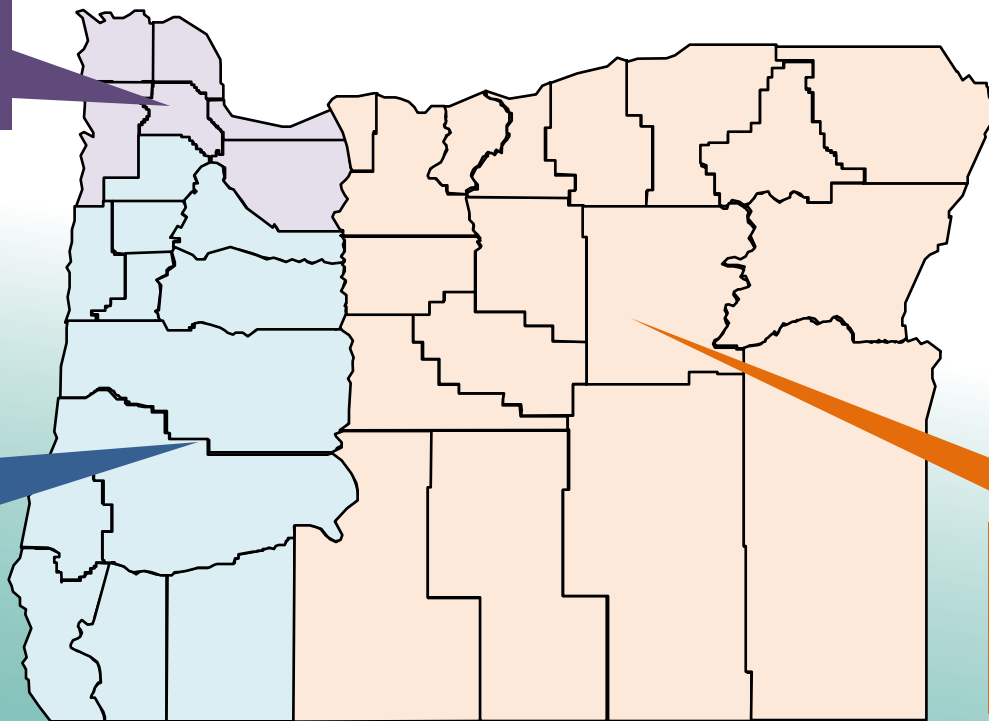
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DEQ Graywater Contacts

Statewide Program Coordinator
Ron Doughten
503-229-5472

Northwest Region
Connie Schrandt
503-229-5347

Western Region
Dan Wiltse
541-687-7436



Eastern Region
Diane Naglee
541-523-9097