

Tier One Greywater System Checklist and Irrigation Area Estimation Tool



Department of Health – Environmental Health & Safety
Local Health Support Program
PO Box 47824
Olympia WA 98504-7824
Phone: (360) 236-3330
Fax: (360) 236-2257
Website: www.doh.wa.gov/wastewater

Can I use a Tier One Greywater System at my home?

Yes...when:

- My county allows the use of Tier one systems. Find your [local health jurisdiction](#)'s website.
- I follow the local and state rules for a Tier one Greywater System in [Chapter 246-274 WAC](#).
- I use a diversion valve to control where the greywater goes.
- I use greywater to irrigate the plants or lawn.
- My greywater remains below the surface of the ground so that people and animals do not come in contact with it.
- My greywater comes only from the clothes washing machine, hand washing sink in a bathroom, and/or bath/shower.
- I own my single family home.
- One irrigation area uses 60 gallons per day or less.
- I do not use more than two 60 gallon per day irrigation areas.
- All my greywater can be diverted to my sewer line or approved on-site sewage system.
- The greywater flows by gravity to the irrigated area – no pumps are used. If using the washing machine, do not move the water higher or further than the washing machine is capable of or it will quickly wear out.
- My greywater is not used for washing diapers or similarly dirty clothes that could carry infectious germs.
- I complete the checklist, keep it on my property, and follow the operation and maintenance guidelines described below.

What else should I think about?

- The chemicals in greywater can hurt your plants. Laundry detergents contain salts that can hurt the plants and soil.
- Greywater is often alkaline. Plants that prefer to live in acidic soil do not do well when irrigated with greywater.
- It is important to make sure the garden or landscape is planted in a healthy soil with plenty of mulch, humus, or compost because these help to breakdown chemicals in the greywater and helps make sure water is available to plants. Learn more about soil at [Soils for Salmon](#).
- It is important to adjust the design of your system when the number of people using your system changes.
- When you sell your home, you need to tell the new homeowners about your system.
- Do not use your greywater system when people in your home are sick.
- Changing any part of your plumbing system has potential for creating problems. You must follow the local rules for altering the plumbing in your home. Learn more at <https://fortress.wa.gov/ga/apps/sbcc/page.aspx?nid=3>
- The greywater system should be used like an outdoor faucet. It is only turned on when plants need water.
- To learn more about greywater reuse visit Washington State Department of Health's [Greywater Reuse Useful Links](#) webpage.

Tier One Greywater System Checklist and Irrigation Area Estimation Tool

TIER ONE GREYWATER SYSTEM CHECKLIST

Owner: _____

Telephone: _____

Project Location Address: _____

Legal Description of Property: _____

- I am sure the local health district allows greywater subsurface irrigation systems where my home is located. Check with your [local health jurisdiction](http://www.doh.wa.gov/AboutUs/PublicHealthSystem/LocalHealthJurisdictions.aspx) (<http://www.doh.wa.gov/AboutUs/PublicHealthSystem/LocalHealthJurisdictions.aspx>).
- All General requirements (<http://app.leg.wa.gov/wac/default.aspx?cite=246-274-011>) and Tier 1 (<http://app.leg.wa.gov/wac/default.aspx?cite=246-274-100>) regulations have been followed.
- I have attached a scaled layout sketch of the system showing the systems design, including:
 - The source of the greywater (only allowed from bathtubs, showers, bathroom sinks, washing machines, and laundry-utility sinks).
 - The location of diversion valve.
 - The distance from items in Table 1 below.
- The irrigation area is designed so that not more than 60 gallons per day is used; not more than two Tier one irrigation areas are on one home.
 - Quantity of greywater estimated for 1st irrigation system: _____ gallons per day (use Step 1 below).
 - Quantity of greywater estimated for 2nd irrigation system: _____ gallons per day (use Step 1 below).
- Total irrigation area is _____ square feet (use Step 2 to determine the maximum area allowed based on the climate in your region.)
- The soil is a healthy garden soil that contains compost and the movement of water, air, and roots is sustained to support healthy plant life. At least two inches of mulch is maintained throughout the growing season. Learn more about soil at <http://www.soilsforsalmon.org/pdf/SoilsforSalmonLIDrev9-16-04.pdf>
- Plumbing regulations were followed. Learn more at <https://fortress.wa.gov/ga/apps/sbcc/page.aspx?nid=3>
- The diversion valve is clearly labeled and readily accessible to the user.
- Local regulations:
 - All local codes have been followed. Check with your [local health jurisdiction](http://www.doh.wa.gov/AboutUs/PublicHealthSystem/LocalHealthJurisdictions.aspx) to learn more.
 - I do not live in an environmentally sensitive area.

Tier One Greywater System Checklist and Irrigation Area Estimation Tool

Tier One Greywater System Tools

Follow these steps to estimate the volume of greywater you will generate and the approximate land area you will need to properly distribute the greywater.

Step 1 Estimate quantity of greywater produced per day based on the number of people living in your home:

Laundry system

- Water conserving washing machine8 gallons per person per day
- Traditional washing machine.....11 gallons per person per day
- Laundry sink3 gallons per person per day

Bathroom system

- Water conserving sink.....5.4 gallons per person per day
- Water conserving shower.....10 gallons per person per day
- Traditional sink6 gallons per person per day
- Traditional shower17 gallons per person per day
- Bathtub.....24 gallons per bath

Use this information* as a guide to estimate the volume of greywater you expect to generate in a day.

NOTE: Correctly estimating the quantity of greywater that is available for irrigation from your system is important. Keep in mind that it is easier to add fresh water during the hot summer months than to replace plants that have died from over watering. Check your plants weekly to make sure excess greywater is not hurting them.

*Estimates came from http://www.ecy.wa.gov/programs/wr/hq/images/ecy_rwcalc.xlsm

“Faucet: 10.8 gallons per person per day. Assuming a 2.2 gallons per minute faucet (at 60 pounds per square inch) has an average flow rate of 1.7 due to lower pressure and not being fully turned on, this would allow faucet use of more than 6 minutes per day. This requires faucets to be turned off while brushing teeth, shaving and rinsing food, so education has a role in this one.” Bathroom sink volume calculation is based on an assumption that half of faucet use is from bathroom sink. (10.8/2=5.4)

Step 2 Use Irrigation Area Map to figure out the required area for 60 gallons per day (see page 5).

(The area was calculated based on the equation in [Chapter 246-274-415 WAC](#) using the evapotranspiration rate in your region during the spring and fall and a factor that estimates the water needs of trees and shrubs using a plant factor of 0.60.)

If the quantity of greywater produced by your system is less than 60 gallons per day, the size of the garden or landscape area can be smaller.

Tier One Greywater System Checklist and Irrigation Area Estimation Tool

Operation and Maintenance

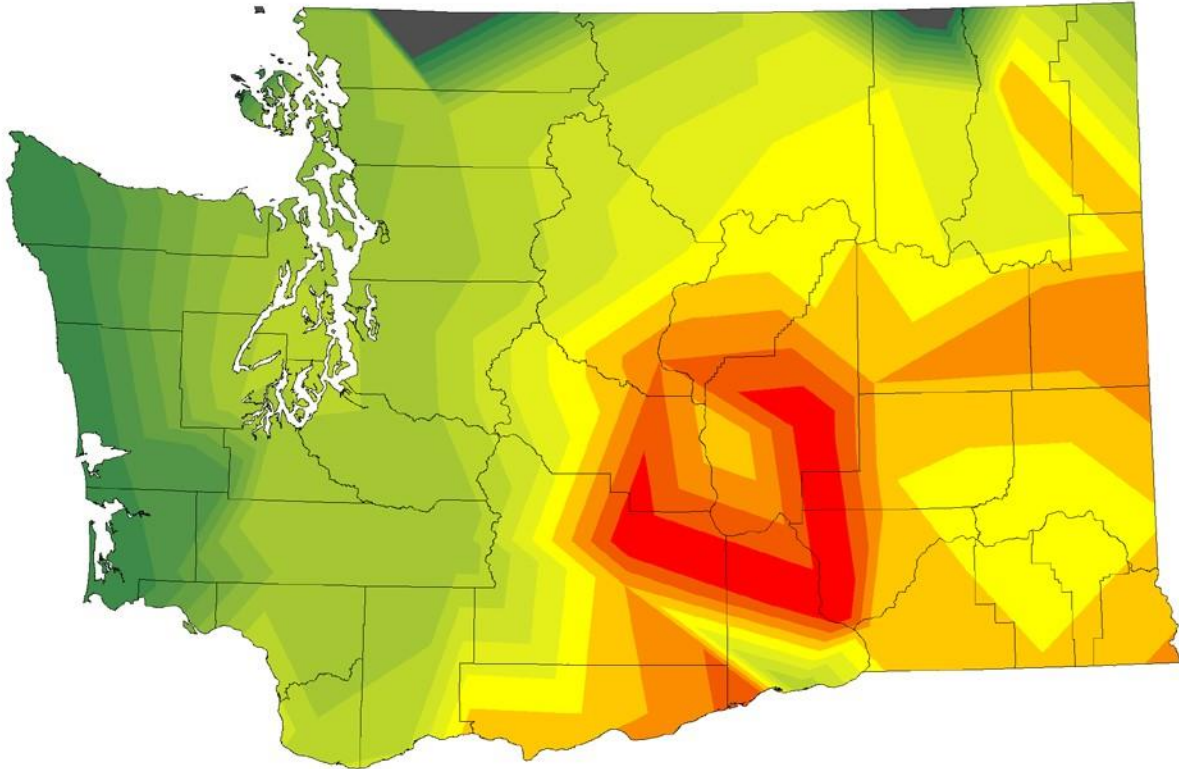
- Responsibility: Homeowners are responsible for proper operation and maintenance of their greywater systems.
- Ponding & runoff: Weekly – check for ponding especially during rain events – absolutely no ponding or runoff is allowed.

Annually: Using Step 1, recalculate the estimated quantity of greywater available for irrigation. Make sure the quantity of greywater produced by the system is less than 60 gallons per day.
- Plant conditions: Check the conditions of the plants for over watering and problems related to chemicals in the greywater. Ensure edible portions of plants do not come in contact with greywater.
- Rain events: Ensure system is not used during rainy times of the year.
- Freeze events: Ensure system is not used during freezing temperatures.
- Storage tanks: Storage tanks are not allowed.
- Filtration: If filtration is used, maintenance of the filtration system is critical. If proper maintenance is not followed, solids can clog the system and create a problem. Specific maintenance schedules are based on manufacturer’s recommendation.
- Documentation: The checklist and drawing are complete and will be kept in the home and given to the new homeowner upon sale of home.

Additional
Information

Tier One Greywater System Checklist and Irrigation Area Estimation Tool

Irrigation Area Map



Area needed for 60 gallons per day Rounded to Nearest 100 Square Feet



July 29, 2011

Map Disclosure Statement:

The Washington State Department of Health does not warrant the accuracy, reliability or timeliness of any information published in this map and assumes no responsibility for errors in the content of the information provided. Persons or entities that rely on any information obtained from this map do so at their own risk.

NOTE: This map is based on evapotranspiration data from many sources. To complete the map, some areas of the state were assumed to be similar to a nearby location. Please contact the State Department of Health's Office of Shellfish and Water Protection at WastewaterMgmt@doh.wa.gov to ask for a copy of the Excel document titled, *Basis for Tier One Map*.

Tier One Greywater System Checklist and Irrigation Area Estimation Tool

Table 1 - Minimum Horizontal Setbacks

	From edge of subsurface irrigation components	From tank and other system components
Building foundations		
Down-gradient ¹ :	10 ft.	N/A
Up-gradient:	2 ft.	N/A
Property or easement line	2 ft.	2 ft.
Pressurized water supply line/public water main	10 ft.	10 ft.
Interceptor/curtain drains/drainage ditches		
Down-gradient:	30 ft.	N/A
Up-gradient:	10 ft.	N/A
In-ground swimming pool	10 ft.	5 ft.
Spring or surface water measured from the ordinary high-water mark ²	100 ft.	50 ft.
Well or suction line	100 ft.	50 ft.
Public drinking water well	100 ft.	100 ft.
Public drinking water spring measured from the ordinary high-water mark	200 ft.	200 ft.
Decommissioned well (decommissioned in accordance with Chapter 173-160 WAC)	10 ft.	N/A
Down-gradient cuts or banks with at least 5 ft. of original, undisturbed soil above a restrictive layer due to a structural or textural change	25 ft.	N/A
Down-gradient cuts or banks with less than 5 ft. of original, undisturbed soil above a restrictive layer due to a structural or textural change	50 ft.	N/A
On-site sewage system primary and reserve areas	10 ft.	N/A

¹The item is down-gradient when liquid will flow toward it upon encountering a water table or a restrictive layer. The item is up-gradient when liquid will flow away from it upon encountering a water table or restrictive layer.

²If surface water is used as a public drinking water supply, the greywater system must be located outside of the required source water protection area.

Drawings must show all items in Minimum Horizontal Setbacks Table that are present on your property. Include details of adjacent property in the drawing to show location and distance of items.

Tier One Greywater System Checklist and Irrigation Area Estimation Tool

Blank scaled layout sketch of the system showing the systems design, including:

- The source and estimation of volume of the greywater
- The location of diversion valve.
- The distance from items in Table 1 below.

Source and Volume of Greywater

Laundry = # of people x _____ gallons per day = _____ gallons per day
Bathtub = # of baths per day x 24 gallons = _____ gallons per day
Shower = # of people using shower x _____ gallons per day = _____ gallons per day
Sink = # of people using sink x _____ gallons per day = _____ gallons per day

Description of System:

Tier One Greywater System Checklist and Irrigation Area Estimation Tool

EXAMPLE:

Blank scaled layout sketch of the system showing the systems design, including:

- The source and estimation of volume of the greywater
- The location of diversion valve.
- The distance from items in Table 1 below.

Source and Volume of Greywater

Laundry = # 3 of people x 11 gallons per day = 33 gallons per day - System 1
 Bathtub = # _____ of baths per day x 24 gallons = _____ gallons per day
 Shower = # 2 of people using shower x 17 gallons per day = 34 gallons per day System 2
 Sink = # 2 of people using sink x 6 gallons per day = 12 gallons per day System 2

Description of System 2 Adults + 1 child live in the home. The home is located in an area where 600 SqFt is allowed for 60 gallons per day.

System 1 has 33 gallons/day. System 2 has 46 gal/day

$\frac{33 \text{ gal/day}}{60 \text{ gal/day}} = \frac{? \text{ SqFt}}{600 \text{ SqFt}} = 330 \text{ SqFt}$	$\frac{46}{60} = \frac{? \text{ SqFt}}{600 \text{ SqFt}} = 460 \text{ SqFt}$
--	--

