

CITY OF ASHLAND



The Permit Process for

OUTDOOR



GRAY WATER

Applications



Homeowners, businesses have options for Graywater use

Oregonians can now reuse Graywater both inside (for flushing toilets) and outside (for watering landscaping) a home or building.

Graywater is wastewater collected from bathtubs, showers, bathroom sinks, and washing machines for reuse.

In 2008, the Oregon Building Codes Division approved statewide alternate methods (SAM) for using Graywater, or water conservation systems, for flushing toilets in both homes and commercial buildings. These methods apply in every Oregon city and county because Oregon has a statewide building codes system. The Building Codes Division is part of the Department of Consumer and Business Services.

The Building Codes Division has created a [Smart Guide on Water Conservation](#) which is available on our website located at <http://www.ashland.or.us>.

For more information about the DEQ's Graywater permitting program or for permit applications for outdoor Graywater use, go to www.deq.state.or.us/wq/reuse/graywater.htm . Get information on obtaining a permit, select "[How to Get a Graywater Permit](#)."

The City of Ashland Community Development Department provides local permit and inspection services. Graywater connections to the home or business require a plumbing permit, in most cases the cost is under \$100. We are available for over the counter consultations. Please visit our web site at <http://www.ashland.or.us> or contact us:

Plumbing Inspector:
Richard Hackstock
Phone: 541-552-2075 Email:
hackstor@ashland.or.us

Water Conservation:
Julie Smitherman
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Reusing Graywater in Your Landscape

A Guide for Oregon Homeowners

How to use this document

This publication is a resource for Oregon homeowners who would like to install a graywater reuse system. In this guide you'll find information on:

- what graywater is and how it can be used;
- the benefits of reusing graywater; and
- simple steps to designing, installing and permitting a graywater reuse and disposal system.

Supplemental information on how to evaluate soils for graywater reuse as well as examples of a subsurface graywater irrigation system and a surface drip irrigation system following graywater treatment are included in appendices. Every graywater reuse system will be slightly different because no two graywater projects are exactly alike. As a homeowner, it's your responsibility to ensure your system complies with state and local codes and doesn't cause harm or damage to yourself, your neighbors, or the environment.

This guide has been written to help Oregon homeowners obtain and comply with a DEQ-permit for a graywater reuse and disposal system installed at single-family residences or residential duplexes with no more than four bedrooms. Technical details on the design, installation, operation or maintenance of a graywater reuse and disposal system should be directed to a professional installer, plumber or landscape professional. More information on Oregon's graywater program and permit applications can be found on the DEQ website at <http://www.deq.state.or.us/wq/reuse/graywater.htm>.

A checkbox marks something you **must** do to obtain a DEQ permit.

! Pay attention to items with an exclamation point: these are critical concepts or requirements that will help you remain in compliance with your DEQ permit.

What exactly is graywater?

Graywater is "used" water originating from kitchen sinks, bathroom sinks, showers, bathtubs, and washing machines. Graywater specifically does not include wastewater from dishwashers, garbage disposals, toilets, wastewater from the washing of cloth diapers or wastewater that contains hazardous chemicals¹ (for example, rinse water from washing oily rags or paint brushes, pesticides/herbicides, and photo lab chemicals). Although graywater is generally of higher quality than combined household wastewater discharged to a sewer or septic system, it can contain elevated concentrations of solids (e.g., hair, lint, food scraps), chemicals (e.g.,



¹ For guidance on the safe disposal of hazardous household chemicals, contact your local waste hauler.



State of Oregon
Department of
Environmental
Quality

Graywater/Reuse Program

811 SW 6th Avenue
Portland, OR 97204
Phone: (503) 229-5472
(800) 452-4011
Fax: (503) 229-6037
Contact: Ron Doughten
www.oregon.gov/DEQ

DEQ is a leader in restoring, maintaining and enhancing the quality of Oregon's air, land and water.

soap, shampoo, detergents, cleaning agents) as well as microorganisms (e.g., bacteria, viruses), including human pathogens.

Oregon recognizes three categories of graywater: Types 1, 2 and 3. Differences in quality, treatment and use of Type 1 and Type 2 graywater are discussed in this guide; the use of Type 3 graywater² is beyond the scope of this guide. See Table 2 for more information on graywater characteristics.

Graywater should not be confused with *recycled water*, which is highly treated wastewater from municipal or decentralized wastewater treatment facilities. Recycled water is permitted and managed differently than graywater.

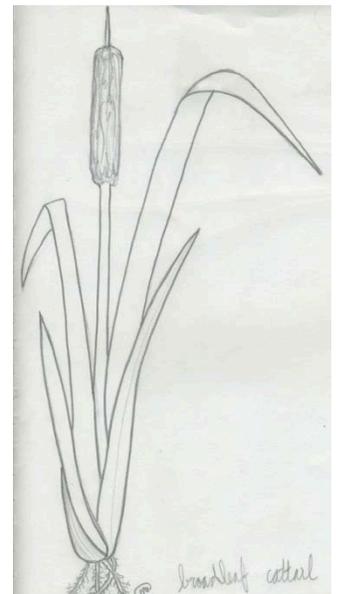
Why reuse graywater?

As environmental awareness has grown and the price of drinking water has risen, the interest and need for water conservation and reuse has grown. It's not necessary to use high-quality potable (drinkable) water for activities such as irrigating lawns or landscape plants. Using graywater for landscape irrigation is a smart way for homeowners to adopt sustainable water practices and conserve our limited drinking water supplies for activities requiring high-quality water. Homeowners that reuse graywater for lawn or garden irrigation may also see a modest cost savings on their water bill. Finally, when Oregonians reuse graywater, less water is withdrawn from rivers and streams, which helps keep our waterways healthy for fish and people.

Steps for developing a graywater system

State law requires all graywater reuse and disposal systems in Oregon to be designed and permitted. Designing, permitting, operating and maintaining a system to use graywater in the landscape is a relatively simple process accessible to the average homeowner.

1. **Determine use** – Decide how you want to use graywater.
2. **Pick a location** – Using guidelines in this document, verify your graywater reuse site is appropriate.
3. **Estimate your water needs** – Determine how much graywater you need for your chosen use.
4. **Estimate available graywater** - Decide which fixtures from which graywater will be collected. It may not be feasible to capture graywater from every fixture in your house.
5. **Design your graywater system**- Design your graywater system, including collection, distribution and reuse. Depending on the sources of graywater in your home and how you plan to use graywater, your system design may include graywater treatment and storage.
6. **Document your system** - Create a system design plan and operation and maintenance manual for your system
7. **Apply for a permit** - Obtain a permit application from DEQ and apply for a permit. Permit applications and information are available on the [DEQ website](http://www.deq.state.or.us/wq/reuse/graywater.htm)³
<http://www.deq.state.or.us/wq/reuse/graywater.htm>.



² Type 3 graywater can be used for a wider variety of beneficial purposes but it must be disinfected. Permits and fees will vary based on the situation. Contact DEQ for more information.

³ For a complete list of websites mentioned in this document, see additional resources at the end of this guide.

8. **Install your system** - Almost all graywater systems will require a plumbing permit and must comply with the [Oregon Specialty Plumbing Code](#).
9. **Operate, maintain and report** - Use your graywater only when you need it. Monitor and maintain your system. And finally, submit an annual report to [DEQ](#). It could save you some money.

According to the U.S. Environmental Protection Agency, a typical US residence produces approximately 90 to 100 gallons of graywater each day.

1. Determine use

Oregon law allows graywater to be used for specific beneficial purposes, such as irrigating lawns and gardens. Since some uses of graywater require a higher quality⁴ of graywater than others, identifying how you want to use graywater is the first step in designing a graywater reuse and disposal system. Review the following list of graywater uses and note the “type” or quality of graywater required for your specific use or uses of graywater. (You can reuse your graywater for more than one purpose.) Note the special conditions and permit information for each graywater use. This information will help you decide which graywater use is best for your situation. If you are interested in using graywater for toilet or urinal flushing, you are required to purchase an “off-the-shelf” designed system and get a local plumbing permit.⁵ Contact your local building officials for information on using graywater for toilet and urinal flushing.

If you want to use graywater for subsurface irrigation of...

- Gardens, lawns and/or landscape plants
- Food crops - excluding root vegetables or any crops whose edible portion would come into direct contact with the graywater
- Vegetated roofs that do not drain to a rain garden, swale or other structure designed to infiltrate stormwater into the ground
- Wetting compost

...then you need **Type 1 graywater**, which is untreated, or has only passed through a physical process (primary filtration) to remove floatable and settleable solids. Examples of primary filtration include grease traps and filters. For an example of a Type 1 system, please see Appendix B. Consider the following to help you determine whether or not you want to use Type 1 graywater.

Special Conditions of Use

- Graywater system must meet setback distances outlined in Table 1
- Graywater can't be stored for more than 24 hours
- The point of graywater discharge must be at least two inches below soil, mulch, etc.
- Graywater must not travel up to the ground's surface, pond or runoff

Permitting

- No documentation other than a permit application needs to be submitted to DEQ
- Straight-forward registration process
- Minimal fees (Fees waived in non-renewal years with the submission of an online report) see Table 3

If you want to use graywater for surface drip irrigation or landscape ponds not intended for human contact...

...then you need **Type 2 graywater**, which in addition to passing through primary treatment, has also been treated further by a chemical or biological process to clean the water. Fruits and

⁴ Quality here refers to the level of treatment your graywater has received, such as passing through a filter. Different levels of treatment lead to different “types” of graywater, see Table 4.

⁵ www.permitsprotect.info

nuts that fall to the ground where drip graywater irrigation is used cannot be harvested for human consumption. Consider the following to help you decide if you want to use Type 2 graywater.

Special Conditions of Use

- Graywater must meet setback distances outlined in Table 1
- Signs must be posted at the point of reuse labeling the water as graywater and stating that the water isn't safe for drinking or swimming (if applicable)
- Ponds must be lined to prevent graywater from seeping into groundwater
- Graywater must be treated to meet the following performance standard: A five-day biochemical oxygen demand of 10mg/L or less and a total suspended solids concentration of 10mg/L or less

Permitting

- Requires documents to be reviewed and approved by DEQ
- More time consuming and expensive than Type 1
- Higher initial cost and annual fees (see Table 3)

2. Pick a location

Your graywater reuse system will be located where you need the water, but keep in mind that graywater must not negatively impact the environment or your neighbors. Consider the following five criteria when evaluating your graywater reuse site:

1. Irrigation sites must not be in places that regularly flood or receive large amounts of runoff at the time of irrigation.
2. The site must not have a slope greater than 45 degrees.
3. During the irrigation season, there needs to be at least four feet of distance between the groundwater and where your graywater is discharged. Dig a hole with a shovel to check or ask a local landscape professional or your local Soil and Water Conservation District for help with determining groundwater levels.
4. Consider the ability of the soil and vegetation in your reuse area to use the graywater (see sections on soil and vegetation below).
5. Types 1 and 2 graywater have different horizontal setback distances that must be observed (Table 1).

Table 1. Setback distance requirements for Type 1 and 2 graywater systems.

Sensitive Feature	Distance from Graywater Irrigation Discharge Point (feet)	Distance from Graywater Irrigation Discharge Point (feet)
	Type 1	Type 2
Groundwater Well	100	50
Springs	100	50
Rivers, Streams, Lakes, Ocean	50	25
Stormwater Management Structures such as Raingardens, Bioswales, and Catch Basins	10	10
Underground Injection Control Systems	10	10
Property Lines	2	2

Create a site diagram

Create a diagram or map of your property that includes the following information (a simple hand-drawn diagram with clear writing is acceptable):

- Total size of your property (not just the area receiving graywater)
- Area measurements and slope of reuse site
- Location of surface streams, springs or other bodies of water
- Location of septic tank or other onsite wastewater treatment system (if any)
- Location of raingardens, bioswales, infiltration basins, dry wells or any other structure intended to capture stormwater and infiltrate it into the soil
- Location of existing or planned wells
- Any escarpments, cuts or fills in the landscape
- Location of any unstable landforms, such as landslides and slumps

Crossing Property Lines

It's fine for you share your graywater with a willing neighbor. If your graywater reuse system crosses a property line:

1. *Both parties agree to reuse graywater in a way that complies with Oregon's graywater rules.*
2. *Both parties sign and honor a written agreement regarding their graywater reuse arrangement.*
3. *The state's officers, agents, employees and representatives are allowed access to enter and inspect all portions of the graywater reuse and disposal system, on both properties.*

Also note on your diagram the uses of adjacent properties (for example, residential housing, commercial, agriculture, etc.). If the neighboring properties have any of the above-listed features (such as a well or raingarden) that are near your graywater reuse area, note it on your diagram.

Keep a written record of your site evaluation!

Evaluate your soil

Having a basic understanding of your soil type (sand, loam, clay) will help you predict how quickly graywater will absorb and infiltrate into the root zone. Water typically infiltrates sandy soils quickly and clay soils slowly. If you plan to irrigate a sandy soil, you may need to use a surge tank to slow down water delivery so plants have time to use the water. Likewise, irrigating a heavy clay soil may require graywater to be delivered at a slower rate or over a larger area to prevent ponding and runoff. Please see Appendix A for easy ways to evaluate your soil profile and infiltration rate. Local landscape professionals or your Soil and Water Conservation District may also provide valuable assistance when evaluating your soils.

Describe the vegetation in the reuse area

Different plants have different water needs, so it's important to consider the type of vegetation you'll be irrigating. Delivering too much or too little water to your plants can damage or kill your landscape vegetation. The rate at which water moves from the soil and to the atmosphere by evaporation from the soil surface or through leaves is known as the **evapotranspiration rate**. Different plants have different evapotranspiration rates. Baseline evapotranspiration rates for plants can be found online or in published landscape references. You can also check with your Soil and Water Conservation District or a professional landscaper or local plant nursery to get more region-specific information. In many cases, it may be enough to know if your vegetation has a very-low, low, medium, or high water needs.

3. Estimate your water needs

The amount of water needed for irrigation will depend on the size of the area you want watered, the vegetation, the climate and the season. For example, how much water do you need to irrigate a 200 square foot lawn in August? The maximum amount of graywater needed for

your identified use(s) is the **system design flow**.

You can easily estimate your water needs for irrigation. If you plan to irrigate an established landscape or garden, you can estimate your water usage from your past water bill or based on the area and type of vegetation. If you're planning a new garden bed, you'll want to estimate water need by following the area and vegetation calculation.

☐ You'll need to know your estimated graywater needs when filling out a permit application.

Method 1: Water bill calculation. If you've irrigated your lawn or garden in the past, look at previous water bills. (Some utilities in Oregon provide this information online as well.) Compare your water usage from your summer bill (when irrigation is most needed) to water usage on your winter bill. If you subtract winter water usage from summer water usage, the difference is typically the amount of water you historically use for irrigation.⁶ Convert that number with the following equation to calculate approximately how many gallons per week you'll need.

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

This calculation estimates your total summer irrigation. If you plan to irrigate more or less of your existing landscape with graywater, you may need to apply a factor to this calculation to get a better estimate on your water needs.

Example water use calculation (water bill method):

Summer water use: 22 ccf
Winter water use: 12 ccf
Days of service: 92

$$\text{Weekly irrigation} = \frac{(22 - 12) \times 748 \times 7}{92} = 569 \text{ gallons per week}$$

Method 2: Area and vegetation calculation. Water needs can also be determined by multiplying the area of irrigation by the water usage (or evapotranspiration rate) in your area. Plant water use is often described as inches of water needed per week. Plant-specific irrigation requirements may be available from local nurseries or landscape professionals. If plant-specific information is unavailable, the irrigation requirements for other landscape plants can be estimated based on the irrigation requirements for a lawn. In Oregon, maximum irrigation need occurs in July and August; as a rule of thumb, lawns require one inch of water per week in mid-summer. The Regional Water Providers Consortium for the Portland area provides the following recommendation for determining vegetation water needs:

- Shrubs: 50% of lawn requirement
- Perennials: 50% of lawn requirement
- Vegetables: 75% of lawn requirement
- Trees: Newly planted trees need regular water for up to the first couple of years, while established trees may need a deep soak or two in summer.

Use the following equation to calculate weekly water needs by the area-vegetation method if you have the weekly irrigation requirement for a lawn:

⁶ Most water suppliers express usage in ccf or 100 cubic feet, which is equal to 748 gallons.

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

where

- A is the area needing irrigation
- ET_{lawn} is the weekly evapotranspiration rate
- K_s is the species factor (ex: percentage of the ET_{lawn}) and
- 0.62 is the conversion from inches of water to gallons.

Example water use calculation (area-vegetation method):

Time: July-August
 Area: 4 – 4'x10' raised beds
 Vegetation: vegetables

$$\begin{aligned} \text{Weekly irrigation} &= 160 \text{ sq. ft.} \times 1 \text{ in.} \times 0.75 \times 0.62 \\ &= 74.4 \text{ gallons per week} \end{aligned}$$

If you need assistance estimating the amount of water you need for irrigation, your local Soil and Water Conservation District and/or water department is a place to start.

! Include your usage assumptions in the system documentation so that future residents will know how much water your system was designed to handle.

4. Estimate available graywater

It’s unlikely that a graywater system installed in a new or existing home will capture all sources of graywater produced by the household--some pipes are extremely hard to get to and some wastewater must go to a sewer or septic system. The quality of graywater will likely vary between fixtures and you may not choose to use it in your system. Each fixture in your house will produce a different amount of graywater, with different characteristics (Table 2).

Table 2. General graywater characteristics by source

Showers and Baths	Bathroom Sinks	Kitchen Sinks	Washing Machine
<ul style="list-style-type: none"> • Relatively Clean • Predictable volume and frequency 	<ul style="list-style-type: none"> • Higher concentrations of personal care products (toothpaste, shaving cream, etc.) • Low volume 	<ul style="list-style-type: none"> • “Dirtiest” source of graywater • May contain fats, oils, grease and other solids • May contain bacteria, viruses and other microorganisms 	<ul style="list-style-type: none"> • Predictable volume and frequency • High concentration of lint/fiber • Detergents can be hard on plants

Deciding which sources to include in your graywater reuse system will depend on a combination of how much water you need, how much water you have, and the degree of difficulty in accessing the fixture’s pipes. All of your interior plumbing must comply with the Oregon Specialty Plumbing Code. The following guidelines will help you determine how much graywater is available from washing machines, sinks and showers.

Washing Machines

If you’re building a system that diverts water from the washing machine you’ll need to do the following equation:

$$\text{Washing machine flow (gal/wk)} = \text{gallons per load} \times \text{loads per week}$$

Example: Your household washes four full loads of laundry per week, typically on Sunday. Your machine is older and uses 30 gallons of water per load. You can generally find the gallons per load listed under the lid of the machine. If not, call the manufacturer or find information on your model from the manufacturer's website.

$$\begin{aligned}\text{Washing machine flow} &= 30 \text{ gal/load} \times 4\text{loads/wk} \\ &= 120 \text{ gal/wk}\end{aligned}$$

Even though you aren't producing this amount of graywater every day, your system needs to be able to handle that volume to accommodate laundry day. If there is an unexpected fifth load of laundry and your graywater reuse area cannot accommodate the excess flow, that water must be sent to the sewer or septic system by switching the 3-way valve (see Installation section). Alternately, if you only need 90 gallons to irrigate your lawn, you can plan to send only three loads worth of water to the reuse system. It's important that these calculations be included in your system documentation so that any future residents in your home know what your system is designed to handle.

Showers

Depending on the location of the pipes, some showers and tubs can easily be re-plumbed for graywater reuse. The flow rate of your shower head is generally found on the side of the fixture. If not, you can still determine the flow by seeing how long it takes to fill up a 1 gallon bucket. Using either method, multiply the gallons per minute by the average time spent showering per day. This will give you a good estimate of the graywater produced by that fixture.

Example: Each person in a three-person household showers five minutes every day. The showerhead is rated at 2.2 gallons per minute.

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

Sinks

Estimating the amount of graywater generated from sinks is more challenging than for showers and washing machines. Sink flow rates are variable, depending on the fixture, person and the activity. In the U.S., faucets made before 1992 typically have maximum flow rates of 5 gallons/minute (gpm). Faucets made after 1992 are limited to a maximum flow rate of 2.5 gpm, with some high efficiency models as low as 1.5 gpm. Online calculators⁷ can estimate your water use, but the most accurate way is to observe and record your water use habits over several days. It's time consuming, but this step will save you time and energy as you design your graywater system.

Keep a record of your estimated available graywater. You'll need this information on the permit application.

Create a water balance

At this point, you know how much water you need for your chosen use, and how much graywater you can capture from your house. A water balance is simply the difference between the amount of graywater you have and the quantity of water you need.

The water balance is a tool to help you design your system. For example, if your water need exceeds the quantity of graywater available, you will need to reduce your water needs or supplement your graywater supply with other sources of water. Since your water needs will vary throughout the year, as the weather changes, you'll have to plan how to manage excess graywater. For example when rainfall provides enough water to meet your needs, you can send

⁷ See 'Additional Resources' for a list of online water calculators.

excess graywater to the septic or sewer system. Although Type 1 graywater can't be stored for more than 24 hours, Type 2 graywater can.

! If you'd like to store excess graywater, your system design must include graywater treatment and storage (see the following section: Design your graywater system).

Example water balances:		
	Example A	Example B
Graywater supply	274 gal/wk	410 gal/wk
Water need (subtract)	110 gall/wk	569 gal/wk
Difference	164 gal/wk surplus	-159 gal/wk deficit
Design options	Reduce the number of fixtures	Plan for supplemental irrigation

5. Design your graywater system

Treatment refers to processes that “clean up” your graywater before use. There are two kinds of graywater treatment for Type 1 and 2 graywater systems: primary treatment and secondary treatment. **Primary treatment** refers to the physical removal of grease, floatable and settleable solids from graywater through use of a grease trap or filters or both. **Secondary treatment** means the removal of organic matter and suspended solids by a chemical or biological process so treated graywater meets the following water quality standard: five-day biochemical oxygen demand (BOD-5) of 10mg/L or less and a total suspended solids (TSS) concentration of 10mg/L or less. A Type 1 graywater system collecting graywater from a kitchen sink must have primary treatment. All Type 2 graywater systems require both primary and secondary treatment.

Table 3. Treatment requirements for Type 1 and Type 2 graywater

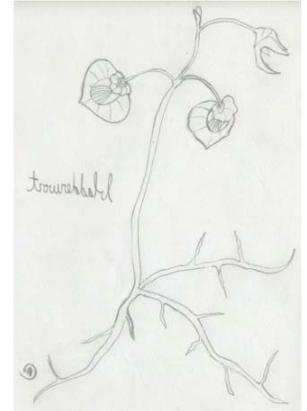
Type 1 Graywater	Type 2 Graywater
Type 1 graywater has not gone through secondary treatment. Graywater coming from a kitchen sink must go through primary treatment. Primary treatment is the physical separation of settleable solids, such as lint, grease, hair, etc. from the graywater. For safety reasons, untreated graywater cannot be stored for more than 24 hours. This precaution greatly reduces the chance for pathogens and bad odors to become problems.	Type 2 graywater goes through both primary and secondary treatment. Secondary treatment means a chemical or biological process to remove a portion of the organic matter and other solids in the graywater. Secondary treatment is defined by the following performance standard: <ul style="list-style-type: none"> • A five-day biochemical oxygen demand of 10mg/L or less. Biochemical oxygen demand means the amount of oxygen needed by organisms in water in order to break down organic matter present. • A total suspended solids concentration of 10mg/L or less. Total suspended solids means the weight of particles floating in water.

Treatment options for Type 2 graywater reuse and disposal systems

There are two basic treatment approaches for Type 2 graywater treatment systems: technology-based treatment and performance-based treatment. Technology-based treatment systems are products that have been certified by a third party to successfully treat graywater to the performance standards. Performance-based treatment refers to any system, purchased or constructed, that can also meet the water quality standards, but hasn't been certified by a third party.

Technology-based treatment. Any technology-based treatment system used in Oregon must have a seal of approval from the American Standards Institute, the International Association of Plumbing and Mechanical Officials, the Canadian Standards Association or from another body recognized by both DEQ and the Oregon Department of Business Services Building Code Division. Along with the purchase price, you should consider any electricity costs for system operation, such as for pumps.

Performance-based Treatment. Performance-based treatment systems can be any design in which treated graywater meets required water quality standards. One common type of treatment is a slow sand filter. Sand filters work by passing graywater through a bed of sand, which traps particles and provides space for bacteria to decompose organic material. Eventually the sand clogs and must be replaced. Slow sand filters don't require adding chemicals, but may need a pump. Another performance-based treatment option is a small outdoor plant treatment system. Plants and the community of microscopic organisms that live in the soil and water around their roots naturally filter water. Plants are a proven method for water treatment. Wetlands are an example of plant communities that slow the flow of water, allow particles to settle, and remove excess nutrients from the water. For an example plant treatment system, see Appendix C.



If you want to treat your graywater to Type 2 standards using a “performance-based” natural treatment system, such as a plant-based wetland system, consider working with a designer familiar with wastewater treatment. At least once per year, a sample of your Type 2 graywater must be collected and analyzed by a private lab to demonstrate the treatment system is working. See Additional Resources, for a link to accredited water testing labs.

! Send the results of graywater testing (when required) to DEQ with your annual report. If you treat graywater using a technology-based system, annual graywater monitoring is not required.

6. Document your system

All graywater reuse and disposal systems must be documented in a **system design plan** and an **operation and maintenance manual**. For Type 2 systems, you must send this documentation to DEQ with your permit application. The documentation for your system stays with the house if the property is sold, which is one reason it's important to document how your system is designed to work.

System design plan. The system design plan must include the following information:

- Beneficial uses of graywater
- Location of the system
- Design flow of the graywater reuse and disposal system
- Fixtures that are the source of graywater
- Design of the distribution and reuse system
- Description of any graywater treatment system used
- Name and contact information for the person responsible for the system design

Operation and maintenance manual. This manual is a short guide on how to operate and maintain your system. It's meant to be a flexible document that you can change and add information to as needed. At a minimum, the operation and maintenance manual must include:

- A detailed description of the graywater system, including any graywater treatment. Consider including the following information in the description of your graywater system:
 - A simple diagram of the system identifying the locations of diversion device (3-way valve, etc.) and the location of any filters or system components

- requiring regular maintenance
- A detailed description of any activities required to operate the system:
 - Describe how and when to send graywater to the reuse system vs. the sanitary sewer
 - Include your assumptions and calculations of how much graywater the system is designed to handle
 - Briefly discuss what types of products are and aren't safe to put in your graywater system
- For Type 2 graywater systems, graywater monitoring procedures:
 - Include steps for monitoring and reporting
- Describe how to maintain the system, such as:
 - Turning on the system in the spring
 - Routine maintenance tasks, such as changing filters or inspecting the system, and approximately how often to perform them
 - Flushing the surge tank and distribution lines
 - Draining the irrigation lines before winter

If your graywater crosses a property line, include your neighbor agreement document in the manual.

7. Apply for a permit

Graywater permitting is done through the Oregon DEQ website. See Table 4 for the type of permit, documentation requirements, and fees for your graywater system.

Plumbing permits are separate and you should check with your installer or with the local building code department to determine what may be required. You'll need to note on the graywater permit application any other permits issued or applied for with this project.

Table 4. Permit structure for graywater reuse systems

Permit Type	Tier 1 (2401)	Tier 2 (2402)
Graywater Type	Type 1 only	Type 1 or Type 2
Flow	< 300 gallons per day	< 1,200 gallons per day
Uses	Subsurface irrigation	Subsurface irrigation Drip irrigation Landscape ponds
Documentation required	Permit application	Permit application System design plan Operations and maintenance manual
Fees (new; annual)*	\$50; \$40	\$534; \$50

**The sum of the new and annual fee is required with every new graywater reuse and disposal system permit. The annual fee for Tier 1 permits will be waived every four out of five years if an annual report is submitted to DEQ.*

8. Install your system

Since every graywater reuse project will be different, this guide cannot give you detailed instructions on how to install your system.

Every system **must** have a diversion device that lets you easily select where to send your graywater—either to your reuse system or a wastewater disposal system.

Your graywater system **must** connect to a sanitary sewer on onsite septic system. On your permit application, you must specify if your graywater system connects to a sewer or an onsite wastewater treatment system (e.g., septic system).

A commonly used diversion device is a 3-way ball valve. See Figure 1 for details. The valve may not be available at your local hardware store, since it's rarely used in traditional

plumbing, but is available online or at pool supply stores. The rest of the plumbing components are very common pieces, and can be purchased at any hardware store.

! If your graywater system connects to a pre-existing irrigation system you **must** install a back-flow valve to protect potable water from contamination. The back-flow valve must be permitted by your local water agency. It's important that all exterior graywater piping be labeled: "Caution - non-potable water. Not safe to drink."

If your system uses a surge tank or a storage tank (Type 2 graywater only), make sure the container is secure (won't tip over), sized to accommodate peak flow, labeled "Caution - non-potable water. Not safe to drink," and is fitted with an overflow drain that's connected to an approved sewage system.

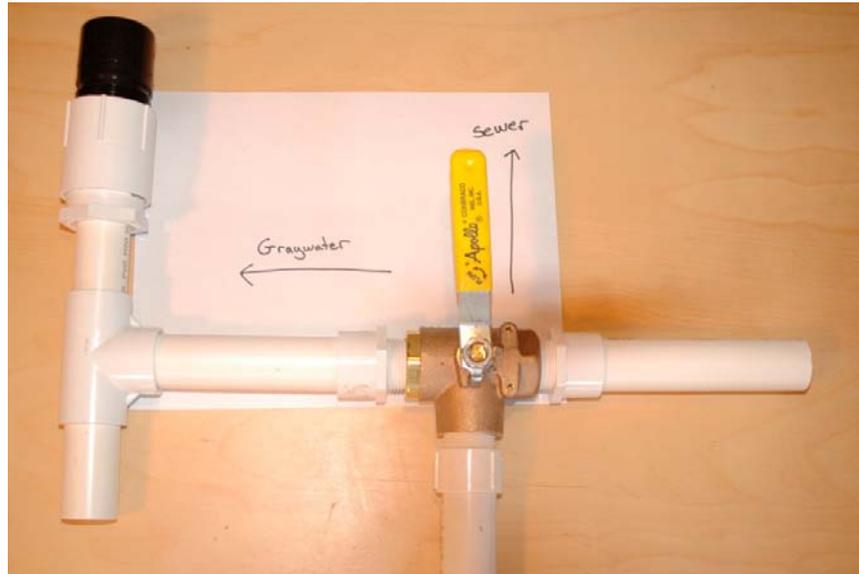


Figure 1. A typical 3-way ball valve. The air vent prevents back flow to the potable water system, which is a must! With clear labels, it's easy to switch between sending graywater to your reuse system or to your wastewater disposal system.

Signage is required for Type 2 graywater systems that involve surface irrigation or landscape ponds. Post easy to see signs that graywater is being used and that the water is not safe for drinking or swimming.

Your graywater irrigation system also needs to be identified as using non-potable water. Purple-colored fixtures, pipes and hoses are commonly used to identify non-potable water. If these materials aren't available from a local hardware or home-improvement store, check with businesses that specialize in rain-water harvesting. It's also acceptable to use some other type of permanent labeling system that alerts someone that graywater is being used for irrigation.

9. Operate, maintain and report on your system

Use your graywater when you need it and use only as much graywater as you need for your use. For people living in the Portland metro area, the website ConserveH2O.org has a zip code specific water calculator that will tell you how many inches of water your lawn needs for the current week.

! If you produce excess graywater, you **must** send it to the sewer or septic system, or treat and store it (Type 2 graywater only) for later use.

You cannot discharge graywater into frozen or saturated soil. If you're unsure whether or not your soil is saturated, do the following simple test: Dig six inches below soil surface. Pick up a handful of soil and squeeze it. If water drips out, your soil is saturated.

! Use biodegradable soaps and detergents when you're sending water to your reuse system. If you need to wash diapers or use chlorine bleach, send that water to your wastewater disposal system.

! Perform routine maintenance on and monitor your system. Note maintenance and changes in your operation and maintenance manual.

! Submit an **annual report** to DEQ using the form on the DEQ website. By submitting an annual report, DEQ will waive the annual fee for Tier 1 permit holders, except in permit renewal years.

Additional Resources

Oregon Department of Environmental Quality
<http://www.deq.state.or.us/wq/reuse/graywater.htm>

Oregon Building Code Department - Plumbing Codes
http://www.bcd.oregon.gov/programs/online_codes.html

Permits Protect – A public-private program including information about building codes and permits for flushing toilets with graywater;
<http://www.permitsprotect.info>

Water use calculators:
www.h20conserve.org

<http://www.swfwmd.state.fl.us/conservation/thepowerof10/>

Irrigation calculator for Pacific NW
<http://irrigation.wsu.edu/Content/Select-Calculators.php>

Water testing labs
<http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Documents/acclab.pdf>

Oregon Soil and Water Conservation Districts
<http://www.oacd.org/>

Acknowledgments:

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Photographs and illustrations: Sarah Eastman
Botanical illustrations: Morgan Whitney

For more information please contact:

Ron Doughten, DEQ water reuse program coordinator, Portland, (503) 229-5472

Alternative formats

Alternative formats (Braille, large type) of this document can be made available. Contact DEQ's Office of Communications & Outreach, Portland, at (503) 229-5696, or call toll-free in Oregon at 1-800-452-4011, ext. 5696. Hearing-impaired persons may call 711.

Appendix A: Infiltration and Soil Type Tests

Easy Infiltration Test

Follow these steps to determine how quickly water can infiltrate your soil. Be sure to do this during the same time of year that you plan to irrigate for the most accurate results.

1. Dig a hole four feet deep. If you hit a layer that is too hard to dig through, stop, record the depth of your hole and proceed with the test. If you find groundwater before four feet, stop. Graywater can't be used in places where the groundwater is closer than four feet to the soil surface.
2. Fill the hole with six inches of water, and record the exact time. Check the water level at regular intervals (every one minute for fast-draining soils to every 10 minutes for slower-draining soils) for a minimum of one hour or until all of the water has infiltrated. Record the distance the water has dropped from the top edge of the hole.
3. Repeat this process two more times, for a total of three rounds of testing. These tests should be performed as close together as possible to accurately portray the soil's ability to infiltrate at different levels of saturation.

Easy Soil-Type Test/Ribbon Test

Use this test to determine what type of soil you have. Soils range from clay to sandy, with loam being the mid-point between the two. Many soils are a combination such as sandy-loam. Clay soils hold water, while sandy soils drain quickly.

1. Put a small handful of soil in your hand and slowly moisten it with water while kneading it.
2. Squeeze the soil and see if you can make an impression of your hand (a cast).
3. Try to form the soil into a ball. Place the ball of soil in the palm of your hand. Squeeze gently between your thumb and fingers, pushing the soil upward into a ribbon.
4. Let the ribbon break from its weight. Use Table 5 below to determine your soil type.

Table 5. Soil types based on sample characteristics.

Soil Sample Characteristics	Soil Type
Soil won't stay in a ball, feels loose and gritty when wet.	Sand
A cast forms, but easily breaks. A ribbon won't form. Soil feels slightly gritty.	Sandy loam
A short ribbon forms but breaks when around 1/2 inch long.	Loam
A ribbon forms but breaks around 3/4 inch. Soil feels slightly sticky.	Clay loam
The ribbon is an inch or more in length. Soil feels very sticky and gritty.	Sandy/silty clay
The ribbon is an inch or more in length. Soil feels very sticky and smooth.	Clay



Appendix B: Type 1 Reuse System Example

No two graywater reuse system are going to be exactly alike. Figure 2 shows a basic example that can be easily adapted to fit your unique situation. Remember, a landscape professional can help you design a system that both meets your needs and complies with regulations.

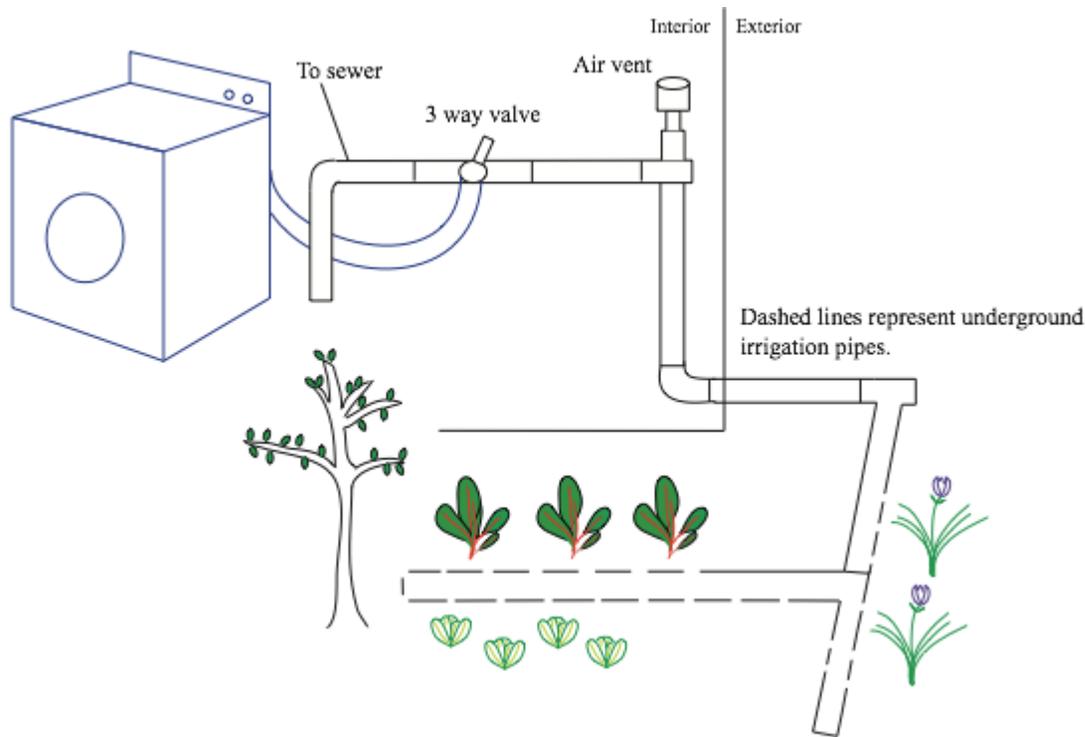


Figure 2. A simplified example of a Type 1 subsurface irrigation system.

Graywater from kitchen sinks must pass through a grease trap. It's recommended that graywater from washing machines pass through a filter. Install your filtration device where the water exits the fixture, before it arrives at the valve. Be sure to empty the filter/grease trap regularly to keep your system running smoothly.

By switching the valve, you can send your graywater to either the sewer, or to your reuse system. The air vent is a critical part of the plumbing. It prevents graywater from back-flowing. The subsurface irrigation system shown in Figure 1 releases water slowly to plants via perforated piping. The exterior pipes must be covered by at least two inches of soil or mulch.



Appendix C: Type 2 Plant Treatment System Example

Plants and the community of microscopic organisms that live around them have been filtering water long before humans took notice. In science the term phytoremediation describes the ability of plants and their associated microscopic organisms to treat water or soils. Wetlands are a prime example of plant communities that slow the flow of water, allow particles to settle, and remove excess nutrients from water.

It's possible to create a treatment wetland for your household graywater on a much smaller scale. After your graywater has gone through primary treatment, such as a grease trap, it can be sent into a constructed wetland for secondary treatment. Your wetland could be in a lined pond or even an old bathtub. Either way, the combination of slowing the flow of water down, wetland plants and the microbial community can effectively treat your graywater to meet the standards discussed in this guide. From there, water can be used for any of the purposes that are allowed for Type 2 graywater. It's recommended that you consult with an expert when designing a plant-based treatment system.



Above and to the left are small-scale plant treatment systems for graywater. The treatment tanks have 'living walls' - which are irrigated by the graywater. This system was built by Paul Kay for demonstration purposes at the Oregon Garden in Silverton.

Wetland Plants

Many different plants could grow in your wetland. It's important, though, that you not choose plants that are considered noxious weeds by the state. These plants can easily spread from your yard to nearby natural areas and take over, creating what are known as monocultures.⁸ Refer to

⁸ Monoculture refers to growing just one type of plant in a given area. Plant monocultures also decrease the diversity of animal species that can survive there.



Table 6 and Table 7 for examples of plants to look for and some to avoid. Other books and articles about constructing treatment wetlands recommend using plants that work well but that Oregon considers noxious. However, lesser-known native plants will do just as well at treating your graywater. These lists are by no means complete. Before buying or growing your wetland plants please check Oregon’s list of noxious weeds <http://www.oregon.gov/ODA/PLANT/WEEDS/lists.shtml>.

Table 6. Examples of wetland plants to avoid.

Common Name	Latin Name
Water Hyacinth	<i>Eichhornia crassipes</i>
Common Reed Native to Africa	<i>Phragmites australis ssp. australis</i>
Yellow Flag Iris	<i>Iris pseudacorus</i>
Reed Canary Grass	<i>Phalaris arundinacea</i>

Table 7. Examples of recommended wetland plants.

Common Name	Latin Name
American White Waterlily	<i>Nymphaea odorata</i>
Common Reed Native to N. America	<i>Phragmites australis ssp. americanus</i>
Common Duckweed	<i>Lemna Minor</i>
Water Sedge	<i>Carex aquatilis</i>
Slough Sedge	<i>Carex obnupta</i>
Broadleaf Cattail	<i>Typha latifolia</i>
Bladderwort	<i>Utricularia macrorhiza</i>
Creeping Spikerush	<i>Eleocharis palustris</i>

Every treatment system will be different. It’s critical that your system comply with the rules. Beyond that, the design decisions are up to you. The cost for materials will depend on your design. Constructing a lined pond may be more expensive than using an old bathtub for instance. **Figure 3** shows an example design for an outdoor treatment wetland that can easily be modified to fit your situation.

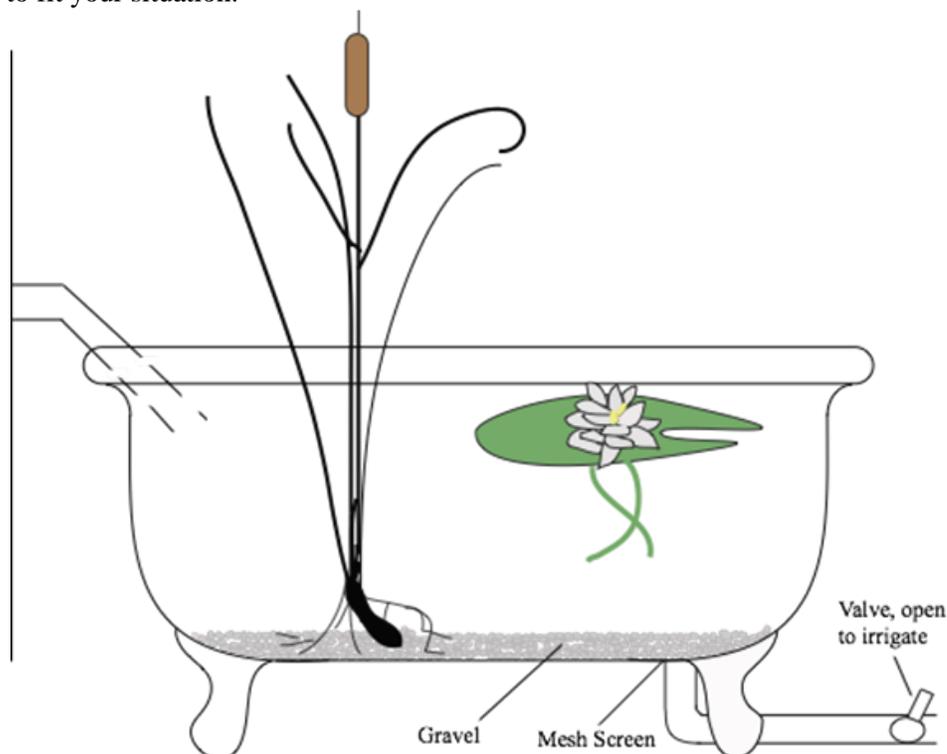


Figure 3. Simplified example of a bathtub treatment wetland for graywater.



Permits for graywater reuse and disposal systems



State of Oregon
Department of
Environmental
Quality

**Water Quality Division
Community and
Program Assistance**
811 SW 6th Avenue
Portland, OR 97204
Phone: 503-229-5696
800-452-4011
Fax: 503-229-6762
www.oregon.gov/DEQ

Contact: Ron Doughten
Phone: 503-229-5472

*DEQ is a leader in
restoring, maintaining and
enhancing the quality of
Oregon's air, land and
water.*

Q: What is graywater?

A: Graywater is wastewater that originates from showers, baths, bathroom sinks, kitchen sinks and laundries. It does NOT include toilet water or wastes, garbage wastes, dishwashing wastewater discharge, garbage disposal discharge or wastewater contaminated by soiled diapers.

Graywater may contain a mixture of organic matter, suspended solids, bacteria and common household chemicals that are disposed down the drain during common household activities.

Q: Why is reuse of graywater important?

A: Using graywater for well-defined, accepted uses can help conserve limited water supplies while advancing the ethic of reusing and recycling.

Q: Why do I have to get a permit to use graywater?

A: Oregon law [ORS 454.610 (1)] requires a person to obtain a permit from DEQ to construct, install, or operate a graywater reuse and disposal system.

Q: There are three different graywater permits. Which one do I need?

A: The type of permit (Tier 1, Tier 2 or Tier 3) is based on the size and complexity of your graywater reuse and disposal system.

Tier 1: A graywater reuse and disposal system in a single-family residence or duplex producing less than 300 gallons per day of graywater that is used only for subsurface irrigation would be eligible for a Tier 1 permit. A person obtaining a Tier 1 permit must register their system with DEQ but is not required to submit any documentation.

Tier 2: A graywater reuse and disposal system in a residential, commercial or institutional structure producing less than 1,200 gallons per day would be eligible for a Tier 2 permit. A Tier 2 permit is also required for any system treating graywater to Type 2 standards. Because of the volume or sources of graywater, these systems represent a higher risk to public health and the environment. A person wishing to obtain a Tier 2 permit must submit information to DEQ for review and approval before getting a permit.

Tier 3: A Tier 3 graywater permit is generally for systems producing more than 1,200 gallons per day of graywater or systems that treat and disinfect graywater to Type 3 standards prior to use. Because these systems are potentially large and complex, DEQ will evaluate each system individually and develop site-specific conditions necessary to protect public health and the environment.

Q: What's in the permits?

A: The permits describe management practices necessary to protect public health and the environment. The permits also require the graywater user to monitor and maintain the system and, in some cases, submit an annual report. The Tier 1 (2401) and Tier 2 (2402) permits are general permits. Copies of general permits can be viewed online at <http://www.deq.state.or.us/wq/wqpermit/genpermits.htm>. The Tier 3 permit is an individual permit and will include custom conditions.

Q: How do I apply for a permit?

A: Information on how to apply for a permit is available on DEQ's website at <http://www.deq.state.or.us/wq/reuse/graywater.htm>. To obtain a permit, you must submit a complete permit application with fees and required documentation to DEQ.

Q: Can I apply and pay for a permit with a credit card online?

A: No. You must mail a completed application with a check to the DEQ office indicated on the permit application.

Q: If I want to install a graywater reuse and disposal system, what do I have to do? Do I just contact DEQ, my city or county, or must I contact other state agencies?

A: If you want to reuse graywater, you must complete the following:

- develop a system design plan,
- develop an operations and maintenance manual,
- obtain a plumbing permit from the local city or county, and
- request a graywater reuse and disposal system permit from DEQ.

In some instances, DEQ may need to review and approve the system design plan and other documents. However, for most homeowners, a person may obtain permit coverage by agreeing to follow some simple best management practices and paying a permit fee. With a DEQ permit, a person may then install and operate a graywater reuse and disposal system as described in their system design plan.

Q: How long will it take to get a permit?

A: Once the permit application package is complete, including fees and documentation, it generally takes 30 days to get coverage under a general permit (2401 and 2402) and up to 6 months to get coverage under an individual permit.

Q: I applied for coverage under the 2401 or 2402 general permit and haven't heard anything. How will I know when I am covered under a permit?

A: DEQ will send you a copy of the signed general permit. Information on the cover page of the permit is specific to your system and identifies your coverage under the permit.

Q: What will the permits cost?

A: The permit fees vary based on permit type.

Tier 1 permit: A person applying for a Tier 1 permit must pay \$90, which includes a \$50 new-permit application fee and \$40 annual fee. Except with a new-permit application and in years when the permit is renewed (currently planned on a 5-year cycle), DEQ will waive the \$40 annual fee if an annual report on system operation and maintenance is submitted to DEQ. An annual report form will be available for Tier 1 permit holders on DEQ's website.



Tier 2 permit: A person applying for a Tier 2 permit must initially pay \$584, which includes a one-time fee of \$534 and then a \$50 annual fee. The one-time new-permit fee is necessary to cover DEQ's costs of reviewing and approving the permit. Unlike the Tier 1 permit, a person covered by a Tier 2 permit is required to submit both an annual report and pay the \$50 annual fee.

Tier 3 permit: The costs of a Tier 3 permit vary based on the system's size and complexity and can range from \$613 to \$3,948 for a new permit; annual fees may be \$341 to \$817.

Q: What would happen if I don't have the required permit for a graywater system? Are there penalties if I operate a graywater reuse and disposal system on my property without a permit?

A: Discharging graywater without a permit is a violation of state law. Unpermitted graywater systems may be subject to enforcement action, including the imposing of civil penalties.

Q: If I already have a graywater reuse and disposal system, is that "grandfathered in," or do I need to get a permit?

A: The Oregon Legislature specifically stated that a person may not construct, install or operate a graywater reuse and disposal system without first obtaining a permit from the DEQ. Anyone who may have a previously installed system has to meet all relevant requirements of the new rules and apply for a permit to operate the system.

Q: I have a small business that will be generating very low volumes (approximately 25 gallons per day) from sinks. Can I get a Tier 1 (2401) permit rather than a Tier 2 (2402) permit?

A: No. Under the Oregon Administrative Rules (OAR 340-053), graywater from non-residential structures can only be permitted under a Tier 2 or Tier 3 graywater permit.

Q: If I use graywater only for toilet flushing, do I need to get a permit from DEQ?

A: No. This type of activity may require a plumbing permit or approval from the Oregon Department of Business and Consumer Services, Building Codes Division. A DEQ permit is not required for indoor graywater reuse activities where the water is ultimately discharged to a sanitary sewer or an onsite wastewater treatment system. This includes toilet and urinal flushing as well as reuse in commercial laundries and car washes.

Q: I plan to reuse graywater for irrigation in a greenhouse. Do I need a permit from DEQ?

A: Yes.

Q: I capture graywater in a bucket and use it to water plants in my house. Do I need a permit from DEQ?

A: No.

Q: The 2401 and 2402 permits require submission of an annual report to DEQ by January 15. What information is required and how will I submit it?

A: If you are covered under either the 2401 or 2402 general permits, you will fill out a form that will be available on the DEQ graywater website in the fall of 2012. On the annual report, you will be required to provide the analytical results from any required



monitoring results (2402 only), how graywater was used during the previous year, the months when graywater was used for irrigation, a brief description of maintenance activities, and brief descriptions of any changes to the graywater reuse and disposal system.

Q: What's the difference between graywater reuse and graywater disposal?

A: Graywater reuse refers to a beneficial activity where graywater replaces another water source. An example of graywater reuse is using graywater to replace some of the municipal or well water you normally use for irrigation. Oregon Administrative Rules (OAR 340-053) allow graywater reuse for specific activities only. Graywater disposal is when you send your graywater to the sewer, a septic system, or other DEQ-permitted wastewater disposal system.

Q: I'm building a new sustainable structure. Do I have to connect to the sewer or install a septic system?

A: In general, yes. Since graywater cannot be reused at all times, unless otherwise approved by DEQ in an individual permit, all new and existing graywater reuse and disposal system must be connected to a wastewater disposal system.

Q: My local county has directed me to install a septic system to develop my property. Can I avoid installing a septic system if I use a graywater reuse and disposal system with composting toilets?

A: In most cases, no. The proposed rules require a graywater reuse and disposal system to be connected to an approved onsite (septic) wastewater treatment system.

Q: The rules describe three types of graywater. What are differences?

A: The rules recognize three different types of graywater based on the quality of the graywater.

- Type 1 graywater has received no treatment or has passed through some type of physical process, such as a filter or grease trap, to remove solids, fats, oils, and grease. Because Type 1 graywater is largely untreated, it cannot be stored for more than 24 hours and it may only be used for subsurface irrigation of landscape plants and compost.
- Type 2 graywater has passed through some type of chemical or biological process, such as a wetland, to further reduce the concentration of solids and organic matter in graywater. Type 2 graywater must be tested at least one-time per year to show that total suspended solids (TSS) and 5-day biochemical oxygen demand (BOD-5) concentrations are 10 mg/L or less. Because the organic material in Type 2 graywater has been stabilized, it can be stored for longer periods of time and used in landscape ponds as well as for drip irrigation.
- Type 3 graywater is Type 2 graywater that has also been disinfected. Type 3 graywater must be tested for total coliform bacteria concentrations 3-times per week. Because it has been disinfected to reduce pathogens, Type 3 graywater can be stored for extended periods of time and can be used for the largest number of uses, including but not limited to sprinkler irrigation, dust control, wash water, and various other uses.



Q: What does it mean that graywater can only be used for irrigation when evapotranspiration rates exceed natural precipitation?

A: Graywater can only be used for irrigation when plants need water in excess of that supplied by rainfall. If you would normally turn on a sprinkler to water plants, it is safe to use graywater. Graywater may not be used during the winter or when plants do not need the moisture, particularly if the ground is frozen or saturated. If the ground is frozen or saturated, graywater could potentially move off-site, affect other properties, contaminate surface waters, and create public health hazards.

Q: Can I use my graywater reuse and disposal system in the winter?

A: Graywater can be used for irrigation only when precipitation cannot meet plant water needs. The proposed rules also prohibit graywater discharges to frozen or saturated soils.

Q: Wastewater from my garbage disposal and dishwasher discharge through my kitchen sink plumbing. Are they considered kitchen sink wastewater?

A: No. Wastewater originating from garbage disposals and dishwashers is not defined as graywater and must be routed to a wastewater disposal system, such as a sewer system or onsite septic system.

Q: Can graywater be used to recharge groundwater?

A: Oregon has an anti-degradation policy that emphasizes prevention of groundwater pollution. As a result, any wastewater, including graywater, must be treated to high standards prior to groundwater discharge. Groundwater recharge could only be allowed with a groundwater evaluation and ongoing monitoring.

Q: Can I design my own graywater reuse and disposal system?

A: Yes. The rules allow individual homeowners to design and install their own graywater reuse and disposal systems. However, DEQ recommends that homeowners consult published literature or graywater experts to get the best system design.

Q: How much does a graywater reuse and disposal system cost to construct and install?

A: The costs of a graywater reuse and disposal system can vary widely, based on the system's size and complexity. A basic do-it-yourself system with components purchased from a hardware store could cost less than \$1,000 and in some cases less than \$100. Large, complex systems with graywater treatment and sophisticated irrigation components could cost more than \$10,000.

Q: Are graywater systems primarily for homes?

A: No. Although DEQ expects most systems to be installed in single-family residences, graywater reuse and disposal systems can be installed in commercial (for example, offices), institutional (for example, schools) and other structures.

Q: When I sell my house, do I have to do anything special?

A: When you sell your house, you must declare the graywater reuse and disposal system as an onsite wastewater system and give the new owner documentation on the system, including the system design plan and the operations and maintenance manual.

Q: I'm purchasing a house with a graywater reuse and disposal system. Do I have to get a permit to use the system?



A: Yes. You may use the system only if you obtain a permit from DEQ. Otherwise, you are required to abandon the system by removing the graywater diversion valve and directing all graywater flow to the sewer or onsite septic system.

Q: I've decided to abandon my graywater reuse system. What do I have to do? Can I put a lock on the diversion valve to prevent the system from being used?

A: Placing a lock on the diversion valve is not sufficient. To abandon a graywater reuse and disposal system, you must physically remove the diversion valve and direct all graywater flow to the sewer or onsite system. You will also need to submit a notice of termination form to DEQ. A notice of termination form will be available on the DEQ graywater webpage in the fall of 2012.

Q: Are other states promoting graywater reuse?

A: Yes. California was one of the first states in the nation to adopt a policy encouraging the reuse of graywater. Other western states that currently allow graywater reuse to varying degrees include Arizona, New Mexico, Texas, Utah, Montana, Wyoming and, most recently, Washington.

For more information please contact:

Ron Doughten, Water Quality, 503-229-5472.

Alternative formats

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For DEQ Use Only

For DEQ Use Only



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

Date Permit Issued

Date

File No.

Amount Received

Check No.

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

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:
City: State: Postal Code: County:
2. Latitude: degrees minutes seconds
Longitude: degrees minutes seconds
3. Township: Section:
Range: Tax Lot #:

GRAYWATER SYSTEM INFORMATION

4. This is a: single family residence with: 1 2 3 4 bedrooms, OR
residential duplex with: 1 2 3 4 bedrooms
5. Wastewater disposal: sewer connection onsite wastewater treatment (i.e., septic system)

GRAYWATER REUSE INFORMATION

6. Planned graywater reuse activities (select all that apply):
Subsurface irrigation of gardens, lawns, and landscape plants (not including vegetable gardens)
Subsurface irrigation of food crops, except root crops or crops that have edible portions that contact graywater
Subsurface irrigation of vegetated roofs that do not drain to stormwater management structures, such as swales, infiltration basins, rain gardens, or similar stormwater structures.
Compost
7. Estimated maximum quantity of graywater needed for reuse in gallons per day:
8. Location of graywater reuse (select all that apply):
on the property on which it was generated.
on an adjacent property with the written approval of the property owner.

GRAYWATER SOURCE INFORMATION

9. **Fixtures from which graywater is collected (select all that apply):**

Fixture	No. of fixtures	Estimated graywater flow (gallons per day)
<input type="checkbox"/> Shower/bath	<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5	
<input type="checkbox"/> Bathroom sink	<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5	
<input type="checkbox"/> Kitchen sink	<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5	
<input type="checkbox"/> Laundry	<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5	
Total estimated daily graywater flow in gallons per day:		

SYSTEM DESCRIPTION

10. Briefly describe the graywater reuse and disposal system (including but not limited to information on the type of primary treatment, if used, use of surge tanks, and a short description of the irrigation system.):

C. GRAYWATER REUSE AND DISPOSAL SYSTEM DOCUMENTS

1. The following information is complete and available for review on request:

- System design plan
- Graywater irrigation site evaluation
- Operation and maintenance manual

2. List all other DEQ or public agency permits issued to or applied for with this project, such as onsite wastewater treatment systems permits and plumbing permits:

Permit	Issuing Agency	Inspection Date

D. 2401 PERMIT NOTIFICATION

1. Please indicate how you would like to receive notification of coverage under the 2401 permit:

- I would like notification of coverage and a copy of the permit sent to the **email address** provided on this application. (If DEQ is unable to contact me via email, I understand that I will be notified at the mailing address provided.)
- I would like notification of coverage and a copy of the permit sent to the **mailing address** provided on this application.

E. SIGNATURE OF LEGALLY AUTHORIZED REPRESENTATIVE

I hereby certify that the information in this application is true and correct to the best of my knowledge and belief. I understand that graywater may only be used for the reuse activities identified above and graywater unsuitable for reuse or in excess of the volume required for the identified reuse activities will be sent to the sanitary sewer or a functioning onsite wastewater treatment system (i.e., septic tank). The graywater reuse and disposal system permit documentation listed in Section C is available for review at the request of the permitting authority.

Signature

Date

- IMPORTANT INFORMATION -

DEQ Permit Fees: SEND CHECK OR MONEY ORDER PAYABLE TO DEQ WITH SIGNED APPLICATION

Permit fees required with this application: \$90.

Send completed application and permit fees to:

Oregon Department of Environmental Quality
Attn: Business Office
811 SW Sixth Avenue, Portland OR 97204
503-229-6114 | 800-452-4011

Other Agency Requirements

You must comply with all applicable local, state, and federal laws and regulations. All pipes, valves, and other plumbing appurtenances of the graywater collection system must comply with the requirements of the Oregon Plumbing Specialty Code. The necessary permits must be obtained from the local building authority. DEQ permit fees do not apply towards any permits required by local authorities.

**Please answer all questions and submit with the required permit application fees.
AN INCOMPLETE APPLICATION OR APPLICATION WITH INCORRECT FEES
WILL NOT BE PROCESSED.**

If the information requested is not applicable, please indicate as such.

A. APPLICANT NAME AND CONTACT INFORMATION

1. Enter the legal name of the applicant. The permit will be issued to this entity. This is typically the owner of the property.
2. Indicate if the applicant is the owner of the property.
3. Provide the email address and telephone number for the applicant. Routine correspondence with the applicant will occur by email unless otherwise indicated.
4. Enter the mailing address for the applicant.

B. GRAYWATER REUSE AND DISPOSAL SYSTEM INFORMATION

1. Enter the street address for the point of graywater generation.
2. Enter the latitude and longitude in degrees/minutes/seconds. Latitude and longitude can be obtained from DEQ's location finder website at <http://deq12.deq.state.or.us/website/findloc/> or from the United States Geological Survey (USGS) quadrangle maps. Instructions on obtaining latitude and longitude data from USGS maps can be obtained from DEQ's website at <http://www.deq.state.or.us/wq/pubs/guides/latlonginstr.pdf>.
3. Enter the township, range, section, and tax lot information for the property.
4. Indicate if the property is a single family residence or residential duplex, and select the total number of bedrooms. Properties with more than four bedrooms are not eligible for coverage under the 2401 General Permit.
5. All graywater reuse and disposal systems covered under a 2401 general permit must connect to a wastewater disposal system--either by a sanitary sewer connection or a functioning onsite wastewater treatment system (i.e., septic system). Select only one option.
6. Indicate how graywater will be used. Multiple selections may be made.
7. Provide an estimate on the maximum amount (in gallons per day) of graywater that will be diverted to reuse for the identified uses.
8. Indicate where graywater will be used. Graywater used on adjacent properties requires the written approval of the property owner.
9. Identify the fixtures from which graywater will be collected. Indicate the number of fixtures and provide an estimate of the total amount of graywater that will be collected from those fixtures. Finally provide an estimate of graywater in gallons per day that will be diverted from all fixtures.
10. Provide a brief description of the graywater reuse and disposal system. If graywater is diverted from a kitchen sink, please describe the physical treatment system that will be used to reduce the grease, floatable and settleable solids from the graywater.

C. GRAYWATER REUSE AND DISPOSAL SYSTEM DOCUMENTS

1. Persons covered under the 2401 WPCF general permit must document and maintain documentation on the system. The following documentation must be complete and available for review on request of the permitting authority:
 - **System design plan.** Including the following information at a minimum: location of the system; a list of the intended uses of graywater; design flow of the graywater reuse and disposal system based on the identified uses of graywater; fixtures that are the source of graywater, including flow and usage information; a description of any graywater treatment used; a description and diagram of the distribution and reuse (i.e., irrigation and ponds) system, including any storage or surge tanks.
 - **Graywater irrigation site evaluation report.** Where graywater is used for irrigation purposes, a site evaluation report containing the following information is required to demonstrate safe reuse of graywater:
 - a diagram of the property receiving graywater showing the location of--area and slope of the graywater reuse area; surface streams, springs, or other bodies of water; onsite wastewater treatment systems; stormwater management structures or stormwater collection systems (e.g., bioswales, raingardens, stormdrains); existing and proposed wells; escarpment, cuts and fills;

- and any unstable landforms;
- parcel size
- soil profile descriptions, including infiltration rates
- water table levels
- description of vegetation in the reuse area
- evapotranspiration rates for vegetation during the period of reuse
- any other information relevant to evaluation of the site, including offsite features
- **Operation and maintenance manual.** The operation and maintenance manual must provide practical information on operating and maintaining the graywater reuse and disposal system. Examples of operation and maintenance activities include but are not limited to: steps for turning on the system, operating the graywater diversion device, cleaning filters, flushing distribution lines, and draining irrigation lines before winter.

2. In order for DEQ to coordinate with other DEQ activities and public agencies, please list all permits issued to or applied for with this project, including onsite wastewater treatment system permits and plumbing permits. Please list the permit, the issuing agency, and the date of inspection.

D. 2401 PERMIT NOTIFICATION

The applicant must select how to receive notification of coverage under the 2401 permit--either via email or standard first-class mail. If DEQ is unable to contact the applicant by email, notification will be sent to the mailing address provided in Section A of the permit application.

E. SIGNATURE OF LEGALLY AUTHORIZED REPRESENTATIVE

The signature of a legally authorized representative must be provided in order to process this application. If the property has more than one owner, each owner must sign the application.

APPLYING FOR COVERAGE UNDER THE 2401 TIER 1 GRAYWATER REUSE AND DISPOSAL SYSTEM WPCF GENERAL PERMIT

How do I obtain coverage under the 2401 General Permit?

1. Complete a 2401 application
 - a. Mail or in permit from the DEQ regional offices. Call 503-229-6114 or 800-452-4011 for location of the location of the nearest regional office.
 - b. Download the application from the DEQ website at <http://www.deq.state.or.us/wq/reuse/graywater.htm>
2. Submit the complete 2401 application and permit fees (\$90) to DEQ's Portland office.
3. If the permit application and fees are accurate and complete, coverage under the 2401 is granted and DEQ will send notification of coverage and a copy of the 2401 permit as requested on the application. If the application or fee is incomplete or the system is ineligible for coverage under the 2401 general permit, DEQ will do one of the following:
 - a. Deny coverage under the 2401 general permit. The applicant will be notified if the applicant's operation cannot be approved for coverage under the 2401 general permit and that the applicant may need to obtain a 2402 general permit or an individual permit.
 - b. Request additional information. An application that incomplete, unsigned, or does not contain the required fee will be returned to the applicant. DEQ requires a complete application and fee in order to assign coverage under the 2401 general permit.

The DEQ 2401 general permit is considered valid when the applicant receives the DEQ confirmation notification.

WATER POLLUTION CONTROL FACILITIES GENERAL PERMIT

Oregon Department of Environmental Quality
811 SW Sixth Avenue
Portland, OR 97204
Phone: 503-229-5630

Issued pursuant to ORS 468B.050

ISSUED TO:

WQ File No: GEN 2401
County/Region:
Registered date:
Legal Name:
Mailing Address :

SOURCES COVERED BY THIS PERMIT:

This permit applies to graywater reuse and disposal systems that:

- Generate graywater from a single family residence or a residential duplex having no more than four bedrooms.
- Collect for reuse no more than 300 gallons of graywater per day.
- Collect and reuse only Type 1 graywater as defined under OAR 340 Division 053.
- Use graywater only for subsurface irrigation.
- Are not located in an area covered by a geographic general permit.

Site Location:

Email:

Gregory K. Aldrich, Administrator
Water Quality Division

Date signed
Effective date: April 16, 2012

PERMITTED ACTIVITIES

Until this permit expires or is modified or revoked, the permittee is authorized to construct, install, modify, or operate a graywater reuse and disposal system in conformance with all the requirements, limitations, and conditions set forth in the attached schedules as follows:

Pages

Definitions	3
Schedule A – Graywater reuse and disposal limitations	4
Schedule B – Minimum monitoring and reporting requirements	6
Schedule C	Reserved
Schedule D – Special Conditions	7
Schedule F – General Conditions	9

Unless specifically authorized by this permit, by another NPDES or WPCF permit, or by Oregon Administrative Rule, any other direct or indirect discharge to waters of the state is prohibited, including discharge to an underground injection control system.

COVERAGE AND ELIGIBILITY

1. A person registered under this permit may reuse graywater only for subsurface irrigation.
2. A person registered under this permit may not allow graywater to discharge to waters of the state, including surface water and groundwater.
3. Graywater unsuitable for reuse or exceeding the volume required for reuse must be discharged to a sanitary sewer or onsite wastewater treatment system.
4. Graywater may originate from a single family residence or residential duplex with no more than four bedrooms.
5. Any person not wishing to be covered or limited by this permit may apply for an individual permit in accordance with the procedures in OAR 340-045-0030.

HOW TO APPLY FOR COVERAGE UNDER THIS GENERAL PERMIT

New Permit Application Requirements

1. A person seeking registration under this permit must do the following:
 - a. Complete an application. Applicants may obtain a DEQ application form by:
 - i. Mail or in person from any DEQ regional office, or
 - ii. Downloading the application from the DEQ website.
 - b. Submit a completed application to the DEQ office identified below at least 30 days prior to the planned activity:

Oregon Department of Environmental Quality
Attn: Business Office
811 SW Sixth Avenue
Portland, OR 97204
 - c. Submit all applicable fees specified in OAR 340-045-0070 with the application.
 - d. Satisfy all local permitting authority requirements, including but not limited to securing all applicable building permits, plumbing permits and inspections.

Permit Renewal Requirements

1. Permittees registered under this General Permit can operate until the expiration date provided on the cover page (unless coverage under the Permit is terminated or extended under Other Application Conditions, below). A registered owner or operator of a graywater reuse and disposal system seeking to continue coverage under this General Permit after the expiration date must submit a complete renewal application form to DEQ no later than February 28, 2017. DEQ may grant permission to submit the application after that date but in no case may an application be submitted after the permit expiration date.

Other Application Conditions

1. Coverage under this permit will continue after the expiration date if the permittee submits a complete renewal application, as described above, and DEQ has not issued a new permit.

2. If DEQ does not receive a renewal application, as described above, coverage under this General Permit is terminated and all operations authorized under this permit must cease by removing the graywater diversion device and directing all graywater flow to a wastewater disposal system.
3. Any person not wishing to be covered or limited by this General Permit may apply for an individual permit in accordance with the procedures in OAR 340-045-0030.

Notification of coverage

1. DEQ will notify the permittee of coverage under this general permit by sending a notice of coverage and copy of the signed permit to the email address or mailing address provided on the permit application. If the permittee elects to receive notification of coverage by email and DEQ is unable to contact the permittee by email, notification of coverage will be sent to the mailing address provide on the permit application.

DEFINITIONS

“Beneficial purpose or reuse” means graywater is used for a resource value, such as to provide moisture. Examples include, but are not limited to, the irrigation of landscape vegetation, planters, greenhouses, vegetated roofs, and compost.

“BOD5” means five-day biochemical oxygen demand.

“Evapotranspiration” means the combined loss of water from a given area, and during a specified period of time, by evaporation from the soil surface and by transpiration from plants.

“Graywater” means shower and bath wastewater, bathroom sink wastewater, kitchen sink wastewater and laundry wastewater. Graywater does not mean toilet or garbage wastes or wastewater contaminated by soiled diapers.

“Type 1 graywater” means graywater that contains dissolved oxygen and may have passed through primary graywater treatment, but has not passed through secondary graywater treatment.

“Graywater reuse and disposal system” means any existing or proposed graywater collection and distribution system equipped with a diversion device that can direct graywater between beneficial reuse and disposal.

“Irrigation” means the application of water to soil, mulch or compost usually to supplement precipitation and supply moisture for the growth of vegetation or for the production of compost.

“mg/L” means milligrams per liter.

“Month” means a calendar month.

“Mulch” means a protective covering spread or left on the ground to reduce evaporation, maintain even soil temperature, prevent erosion, control weeds or enrich the soil.

“Onsite wastewater treatment system” means any existing or proposed subsurface onsite wastewater treatment and dispersal system including but not limited to a standard subsurface, alternative, experimental, or nonwater-carried sewage system. It does not include systems that are designed to treat and dispose of industrial waste as defined in OAR chapter 340, division 045.

“**Oxidized graywater**” means a treated graywater in which the organic matter is stabilized, nonputrescible, and contains dissolved oxygen.

“**Primary graywater treatment**” means a physical process to remove a portion of the grease, and floatable and settleable solids from graywater.

“**Residential strength wastewater**” means septic tank effluent that does not typically exceed five-day biochemical oxygen demand (BOD5) of 300 mg/L; total suspended solids (TSS) of 150 mg/L; total Kjeldahl nitrogen (TKN) of 150 mg/L; oil & grease of 25 mg/L; or concentrations or quantities of other contaminants normally found in residential sewage.

“**Sewerage system**” means pipelines or conduits, pumping stations, and force mains, and all other structures, devices, appurtenances and facilities used for collecting or conducting wastes to an ultimate point for treatment or disposal.

“**Stormwater management structure**” means both public and private structural stormwater controls such as swales, infiltration basins, underground injection control (UIC) systems or similar structures intended to infiltrate stormwater into the ground.

“**Subsurface irrigation**” means the slow release of water below the surface of soil, compost or mulch for the purpose of supplying moisture.

“**TSS**” means total suspended solids.

“**Vegetated roof**” means a system of soil and vegetation that partially or completely covers the roof of a building or man-made structure. Vegetated roofs are also known as living roofs, green roofs or ecoroofs.

“**Waters of the state**” include lakes, bays, ponds, impounding reservoirs, springs, wells, rivers, streams, creeks, estuaries, marshes, inlets, canals, the Pacific Ocean within the territorial limits of the State of Oregon and all other bodies of surface or underground waters, natural or artificial, inland or coastal, fresh or salt, public or private (except those private waters which do not combine or effect a junction with natural surface or underground waters), which are wholly or partially within or bordering the state or within its jurisdiction.

SCHEDULE A

Graywater Reuse and Disposal Limitations

The permittee may construct, install, and operate a graywater reuse and disposal system pursuant to the following limitations:

1. **Beneficial Purposes.** The permittee may reuse graywater only for the following beneficial purposes:
 - a. Subsurface irrigation of gardens, lawns and landscape plants;
 - b. Subsurface irrigation of food crops, except root crops or crops that have edible portions that touch graywater;
 - c. Subsurface irrigation of vegetated roofs that do not drain to stormwater management structures; and
 - d. Subsurface irrigation of compost.
2. **Prohibited Uses.** The permittee may not use graywater for drinking, personal hygiene bathing, showering, cooking, dishwashing, or maintaining oral hygiene.
3. **Connection to wastewater disposal system required.** The graywater reuse and disposal system must be equipped with a graywater diversion valve that allows graywater flow to be directed

between beneficial reuse and either an approved sewerage system, or a functioning onsite wastewater treatment system approved under OAR 340 Division 071. Graywater not suitable for reuse as described in this permit or the rules under OAR 340 Division 053 as well as graywater exceeding the volume needed for reuse must be diverted to a sewerage system or a functioning onsite wastewater treatment system.

4. **No discharge to surface water or stormwater systems allowed.** The permittee may not allow graywater discharge to:
 - a. Surface waters of the state;
 - b. A municipal separate storm sewer system (MS4);
 - c. An industrial stormwater system; or
 - d. A stormwater management system including swales, infiltration basins, underground injection control (UIC) systems, or other structures intended to infiltrate stormwater into the ground.
5. **No groundwater impacts allowed.** The permittee must apply graywater at a rate and in a manner that minimizes the movement of contaminants to groundwater and does not adversely impact groundwater quality. At the time of irrigation, the minimum separation distance between the point of graywater release and groundwater must be at least four feet.
6. **Graywater limitations.** The permittee must divert the following wastewaters to a sewerage system or onsite wastewater treatment system:
 - a. Wastewater originating from kitchen sinks that has not passed through primary graywater treatment;
 - b. Wastewater from dishwashers, garbage disposals, or both;
 - c. Wastewater resulting from the washing of soiled diapers or other similarly infectious or soiled materials; and
 - d. Wastewater containing residual waste from activities such as, but not limited to, cleaning of oily rags; rinsing of paint brushes; disposal of pesticides, herbicides, or other chemicals; or disposal of waste solutions from hobbyist activities like home photo labs.
7. **Graywater reuse and disposal system design.** The graywater reuse and disposal system must be designed to reuse a volume of water needed for a specified beneficial purpose or beneficial purposes. Graywater in excess of the design flow must be diverted to an approved sewerage system or a functioning onsite wastewater treatment system approved under OAR 340-071. The system design must be documented in a written system design plan and transferred to the new owner or operator on property transfer.
8. **Graywater treatment and storage.**
 - a. All graywater originating from kitchen sinks must pass through a physical process to remove a portion of the grease, floatable and settleable solids.
 - b. Graywater may not be stored for more than 24 hours.
9. **Setbacks.** The graywater system must be designed, installed, and operated to meet the following setbacks (in feet):

Feature requiring setback	Graywater storage or surge tank	Point of graywater discharge to landscape
Groundwater supplies and wells	50	100
Springs	50	100
Surface water of the state, excluding springs	50	50
Stormwater management structures, collection systems, and catch basins	10	10
Underground injection control systems (UICs)	10	10
Property boundaries	5	2
Building structures	0	0

10. **Access and Exposure.** The permittee must implement the following access and exposure controls when using graywater:
 - a. All reasonable steps must be taken to ensure that contact with graywater by humans and domestic pets is avoided.
 - b. The point of graywater discharge must be covered by at least two inches of soil, mulch, compost or other suitable material.
11. **Graywater irrigation management.** The permittee may irrigate with graywater pursuant to the following limitations:
 - a. Irrigation sites must be located on stable geologic formations not subject to flooding or excessive runoff from adjacent land at the time of irrigation.
 - b. Graywater may not be applied to areas with slopes exceeding 45 percent.
 - c. Graywater may not be discharged to frozen or saturated soils.
 - d. Irrigation may only occur when evapotranspiration exceeds precipitation.
 - e. The soil and vegetation in the irrigation area must have capacity to accommodate the volume and rate of graywater applied so that discharge to surface water or groundwater does not occur.
 - f. When irrigating a parcel for the production of a food crop, the edible portion of the crop must not contact the graywater, and fruit or nuts must not be harvested off the ground for human consumption.
 - g. Graywater must not surface, pond, or runoff.
 - h. Graywater irrigation must not create objectionable odors, fly and mosquito breeding, or other nuisance conditions.
12. **Operation and maintenance.** The owner or operator of the graywater reuse and disposal system must operate the system as specified in the written operations and maintenance manual that is specific to the system and remains with the system on property transfer.
13. **Property lines crossed.** The permittee may reuse graywater only on the property on which it was generated, unless all of the following conditions are met:
 - a. Both the person generating graywater and the person reusing graywater agree to reuse graywater in accordance with the rules in OAR Chapter 340, Division 53.
 - b. A written agreement exists and is being honored between the person generating graywater and owner of the property where graywater reuse occurs.
 - c. The state's officers, agents, employees and representatives are allowed access to enter and inspect all portions of the graywater reuse and disposal system, regardless of location.
14. **Waste strength limitations.** The permittee may not divert graywater from an onsite wastewater treatment system if the resulting septic tank effluent concentration exceeds the criteria for residential strength wastewater. If the resulting septic tank effluent concentration does exceed the criteria for residential strength wastewater, the permittee must take appropriate measures to reduce the septic tank effluent waste strength, such as but not limited to reducing the amount of graywater diverted from the onsite wastewater treatment system.
15. **Graywater reuse and disposal system abandonment.** A permittee that abandons a graywater reuse and disposal system must remove the graywater diversion valve and direct all graywater flow to an approved sewerage system or a functioning onsite wastewater treatment system approved under OAR 340 Division 071.

SCHEDULE B

Minimum Monitoring and Reporting Requirements

1. **Monitoring and reporting.** The permittee must monitor the operation of the graywater reuse and disposal system. In lieu of an annual permit fee, the permittee may submit an annual report to DEQ

by January 15 with a statement certifying that during the previous year, the system was operated in compliance with this permit and the rules in OAR 340 Division 053. The annual report must be submitted on a form approved by DEQ and must contain the following information:

- a. The months during which graywater was used for irrigation;
- b. A brief description of any maintenance activities completed on the system, such as, but not limited to, cleaning or replacing filters, replacing worn or damaged components, or flushing the system to remove accumulated debris;
- c. A brief description of any changes to the graywater reuse and disposal system, including but not limited to:
 - i. The addition or removal of any fixtures on the graywater collection system;
 - ii. Any changes to graywater storage such as the addition or removal of a graywater storage or surge tank;
 - iii. Modification of the graywater distribution system; and
 - iv. The addition or removal of graywater irrigation areas.
- d. Any changes or updates made to the system design plan or operations and maintenance manual or both.

SCHEDULE D

Special Conditions

1. **System design plan.** The permittee must implement and maintain a written system design plan that includes, but is not limited to, the following information:
 - a. Location of the system;
 - b. Fixtures that are the source of graywater;
 - c. Design flow of the graywater reuse and disposal system;
 - d. Design of the distribution and reuse system;
 - e. Description of any graywater treatment system used;
 - f. Beneficial reuses of graywater; and
 - g. Name and contact information for the person responsible for the design of the system, including:
 - i. Name;
 - ii. Address;
 - iii. Phone number;
 - iv. Email address, if available.

The design plan must be made available for review on request by DEQ or DEQ's agent.

2. **Graywater irrigation site evaluation.** The permittee must evaluate and maintain a record on all graywater irrigation areas, including the following:
 - a. A diagram of the property receiving graywater showing:
 - i. Area and slope of the graywater reuse area;
 - ii. Surface streams, springs or other bodies of water;
 - iii. Onsite wastewater treatment systems;
 - iv. Stormwater management structures or stormwater collection systems;
 - v. Existing and proposed wells;
 - vi. Escarpments, cuts and fills; and
 - vii. Any unstable landforms;
 - b. Parcel size;
 - c. Soil descriptions, including water infiltration rates;
 - d. Water table levels;
 - e. Description of vegetation in the reuse area;

- f. Evapotranspiration rates for the vegetation during the period of use; and
 - g. Any other observations or information relevant to the evaluation of the graywater irrigation site, including offsite features, as appropriate.
3. **Operation and maintenance manual.** The permittee must maintain a written operation and maintenance manual that includes, but is not limited to, the following information:
- a. A detailed description of the graywater system, including any graywater treatment, and
 - b. A detailed description of any activities required to operate and maintain the system. Examples of operation and maintenance activities include but are not limited to: steps for turning on the system, operating the graywater diversion device, cleaning filters, flushing distribution lines, and draining irrigation lines before winter.
- The operation and maintenance manual must be kept up to date and revised when modifications are made to the system design or operation.
4. **Construction Standards.** The permittee must ensure that a graywater reuse and disposal system meets the following standards:
- a. Graywater collection system. All pipes, valves and other plumbing appurtenances of the graywater collection system must comply with the requirements of the Oregon Plumbing Specialty Code.
 - b. Diversion valve. The graywater diversion valve must be readily accessible and clearly labelled. The diversion valve must be constructed of material that is durable, corrosion resistant, watertight and designed to accommodate the inlet and outlet pipes in a secure and watertight manner.
 - c. Cross connection control. A direct-connection between a potable water supply system and graywater reuse and disposal system is not allowed.
 - d. Storage and surge tanks. If a storage or surge tank is installed, it must be:
 - i. Sized to accommodate peak graywater flow;
 - ii. Fitted with controls to limit access to humans, domestic pets and vectors;
 - iii. Installed below ground on level, well-compacted soil, or above ground on a level, stable footing, per the manufacturer's installation instructions;
 - iv. Equipped with an anti-buoyancy device, if installed below ground where high groundwater could dislodge the tank;
 - v. Designed to prevent overturning, if installed above ground;
 - vi. Labelled with "Caution – Nonpotable Water – Not Safe to Drink"; and
 - vii. Fitted with an overflow drain with a diameter at least equal to that of the inlet that flows by gravity to an approved sewerage system, or a functioning onsite wastewater treatment system or holding tank system approved under OAR 340 Division 071. The overflow drain must not be equipped with a shutoff valve.
 - e. Distribution system. The graywater distribution system, excluding irrigation components, must satisfy the following requirements:
 - i. All piping and other plumbing components must be listed by an ANSI accredited product listing program.
 - ii. The manufacturer of system components must be properly identified.
 - iii. Installation must conform to the equipment and installation methods identified by the manufacturer and product listing.
 - iv. All exterior graywater piping, valves and other graywater equipment must be marked or labelled to identify it as containing nonpotable water. All exterior piping and tanks must be labelled: "Caution – Nonpotable Water – Not Safe to Drink."
 - f. Irrigation system. Irrigation components must be marked or labelled as containing nonpotable water and meet the irrigation specifications in the system design plan.
5. **System alterations.** The permittee must obtain permits from the local authority, as necessary, to make system alterations, such as plumbing permits. The permittee must notify DEQ in writing of

any physical changes to the graywater reuse and disposal system that makes the system ineligible for this general permit.

6. **Revocation.** As described in OAR 340-045-0033, DEQ may revoke a general permit as it applies to any person and require such person to apply for and obtain an individual permit if:
 - a. The permitted source or activity causes a serious danger to public health, safety, or the environment;
 - b. The permitted source or activity is a significant contributor of pollution or causes environmental problems;
 - c. The permittee is not in compliance with the terms and conditions of this general permit;
 - d. Conditions or standards have changed so that the source or activity no longer qualifies for a general permit.

SCHEDULE F WPCF GENERAL CONDITIONS – GRAYWATER

SECTION A. STANDARD CONDITIONS

1. **Duty to Comply with Permit.** The permittee must comply with all conditions of this permit. Failure to comply with any permit condition is a violation of Oregon Revised Statutes (ORS) 468B.025 and grounds for an enforcement action. Failure to comply is also grounds for DEQ to modify, revoke, or deny renewal of a permit.
2. **Property Rights and Other Legal Requirements.** Issuance of this permit does not convey any property rights of any sort, or any exclusive privilege, or authorize any injury to persons or property or invasion of any other rights, or any infringement of federal, tribal, state, or local laws or regulations.
3. **Liability.** DEQ or its officers, agents, or employees may not sustain any liability on account of the issuance of this permit or on account of the construction or maintenance of facilities or systems because of this permit.
4. **Permit Actions.** After notice by DEQ, this permit may be modified, suspended, or revoked in whole or in part during its term for cause including but not limited to the following:
 - a. Violation of any term or condition of this permit, any applicable rule or statute, or any order of the Commission;
 - b. Obtaining this permit by misrepresentation or failure to disclose fully all relevant facts.
5. **Transfer of Permit.** This permit may not be transferred to a third party. On the transfer of a property with a graywater reuse and disposal system, the person releasing claim to the property must notify the receiving person that a graywater reuse and disposal system is present. The person taking possession of the property must obtain a permit to operate the system or must abandon the system as specified under OAR 340-053-0100.
6. **Permit Fees.** The permittee must pay the fees required by Oregon Administrative Rules.

SECTION B. OPERATION AND MAINTENANCE OF POLLUTION CONTROLS

1. **Proper Operation and Maintenance.** At all times the permittee must maintain in good working order and properly operate as efficiently as possible all treatment or control facilities or systems installed or used by the permittee to comply with the terms and conditions of this permit.
2. **Standard Operation and Maintenance.** All graywater collection, control, treatment, reuse, and disposal facilities or systems must be operated in a manner consistent with the following:
 - a. At all times, all facilities or systems must be operated as efficiently as possible in a manner that will prevent discharges, health hazards, and nuisance conditions.

- b. All screenings, grit, and sludge must be disposed of in a manner approved by DEQ to prevent any pollutant from the materials from reaching waters of the state, creating a public health hazard, or causing a nuisance condition.
3. **Noncompliance and Notification Procedures.** If the permittee is unable to comply with conditions of this permit because of a breakdown of equipment, facilities or systems; an accident caused by human error or negligence; or any other cause such as an act of nature, the permittee must:
 - a. Immediately take action to stop, contain, and clean up the unauthorized discharges and correct the problem.
 - b. Immediately notify DEQ's Regional office so that an investigation can be made to evaluate the impact and the corrective actions taken, and to determine any additional action that must be taken.
 - c. If a graywater or wastewater discharge occurs to a public right-of-way, stormwater catch basin or other stormwater management structure, the permittee must immediately notify the local authority having jurisdiction, such as the appropriate city or county agency.
 - d. Within 5 days of the time the permittee becomes aware of the circumstances, the permittee must submit to DEQ a detailed written report describing the breakdown, the actual quantity and quality of waste discharged, corrective action taken, steps taken to prevent a recurrence, and any other pertinent information.

Compliance with these requirements does not relieve the permittee from responsibility to maintain continuous compliance with the conditions of this permit or liability for failure to comply.

SECTION C. MONITORING AND RECORDS

1. **Inspection and Entry.** The permittee must at all reasonable times allow authorized representatives of DEQ to:
 - a. Enter upon the permittee's premises where a waste source, reuse, or disposal system is located or where any records are required to be kept under the terms and conditions of this permit;
 - b. Have access to and copy any records required by this permit;
 - c. Inspect any treatment, reuse, or disposal system, practices, operations, monitoring equipment, or monitoring method regulated or required by this permit; or
 - d. Sample or monitor any substances or permit parameters at any location at reasonable times for the purpose of assuring permit compliance or as otherwise authorized by state law.
2. **Averaging of Measurements.** Calculations of averages of measurements required for all parameters except bacteria must use an arithmetic mean; bacteria must be averaged as specified in the permit.
3. **Monitoring Procedures.** Monitoring must be conducted according to test procedures specified in the most recent edition of *Standard Methods for the Examination of Water and Wastewater*, unless other test procedures have been approved in writing by DEQ and specified in this permit.
4. **Retention of Records.** The permittee must retain records of all monitoring and maintenance information, including all calibrations, copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least 3 years from the date of the sample, measurement, report or application. DEQ may extend this period at any time.

SECTION D. REPORTING REQUIREMENTS

1. **Plan Submittal.** Pursuant to Oregon Revised Statute 468B.055, unless specifically exempted by rule, construction, installation, or modification of disposal systems, treatment works, or sewerage systems may not commence until plans and specifications are submitted to and approved in writing

by DEQ. All construction, installation, or modification shall be in strict conformance with DEQ's written approval of the plans.

2. **Change in Discharge.** Whenever a facility expansion, production increase, or process modification is expected to result in a change in the character of pollutants to be discharged or in a new or increased discharge that will exceed the conditions of this permit, a new application must be submitted together with the necessary reports, plans, and specifications for the proposed changes. A change may not be made until plans have been approved and a new permit or permit modification has been issued.
3. **Signatory Requirements.** All applications, reports, or information submitted to DEQ must be signed and certified by the official applicant of record (owner) or authorized designee.

**State of Oregon
Building Codes Division
Alternate Method Ruling No. OPSC 08-02**

**APPROVAL OF WASTEWATER CONSERVATION SYSTEMS AS A STATEWIDE
ALTERNATE METHOD OF PROVIDING WATER FOR FLUSHING TOILETS AND
URINALS**

Statewide Alternate Methods are approved by the Division administrator in consultation with the appropriate advisory board. The advisory board's review is limited to the technical and scientific merits of the proposal. In addition:

- *building officials shall approve the use of any material, design or method of construction addressed in a statewide alternate method,*
- *the decision to use a statewide alternate method is at the discretion of the designer,*
- *statewide alternate methods do not limit the authority of the building official to consider other proposed alternate methods encompassing the same subject matter*

Initiated By: The Building Codes Division

APPLICABLE CODE SECTIONS:

None

BACKGROUND:

A wastewater conservation system treats and distributes untreated wastewater that has not come into contact with toilet waste for the purpose of flushing toilets and urinals in single-family residential structures. Water conservation system water is limited to used water from bathtubs, showers, bathroom washbasins, clothes-washers and laundry tubs. This ruling does not include wastewater from kitchen sinks or dishwashers.

Many other states allow wastewater conservation systems under plumbing codes and through alternate methods. Water conservation systems are being installed in California, New Mexico, Arizona, Washington, New York, Massachusetts, Texas, Vermont and Utah.

PROCEDURAL HISTORY:

The division initiated this alternate method ruling as a means of addressing sustainability in Oregon. On June 20, 2008, the division presented a statewide alternate method for plumbing systems that conserve water from certain plumbing fixtures, to the Oregon State Plumbing Board, specifying standards for the design and installation of non-potable water systems. The division has revised the alternate method based on the Board's feedback.

TECHNICAL DISCUSSION:

Under Oregon law, when the division considers making an alternate method ruling on a method of construction, it must consider “standards and interpretations published by the body that promulgates any nationally recognized model code adopted as a specialty code of this state.” ORS 455.060.

The International Code Council (ICC) through its Evaluative Services and in the text of the International Plumbing Code (IPC) recognizes water conservation systems. The IPC indicates that with adequate conditions placed upon installation and use, water conservation systems are effective. In terms of authoritativeness, several ICC model codes form the basis of the state building code in Oregon. Water conservation systems are also listed by the International Association of Plumbing and Mechanical Officials (IAPMO), which promulgates the model plumbing code currently adopted by Oregon.

IAPMO has the following product standard for water conservation systems, IAPMO IGC 207-2006. In addition to this standard by the entity that publishes Oregon’s model codes, another authoritative source, the Canadian Standards Association (CSA) publishes CSA B128.1-2006 as the standard for water conservation systems.

FINDINGS:

As approved by the Oregon State Plumbing Board and the Residential Structures Board, the following scientific and technical facts apply to water conservation systems as an alternate method:

- The acceptable standards for performance and installation of water conservation systems includes IAPMO IGC 207-2006 and CSA B128.1-2006.
- Water conservation systems are being installed in California, New Mexico, Arizona, Washington, New York, Massachusetts, Texas, Vermont and Utah. These states have used codes (including nationally recognized codes standard published by the International Code Council (ICC) and the International Association of Plumbing and Mechanical Officials (IAPMO) as the basis for the installations.
- Approved water conservation systems shall be installed as per the statewide plumbing code, the attached ruling, any ANSI accredited product listing program and the manufacturer’s installation instructions.
- This statewide alternate method ruling 08-02 applies to installation in single-family residential structures, rowhouses and townhouses only.

SCOPE OF RULING:

This ruling addresses water conservation systems for residential use of flushing toilets and urinals. This ruling is limited to used water from bathtubs, showers, bathroom wash basins, clothes-washers and laundry tubs. It does not include wastewater from kitchen sinks or dishwashers. The system shall have no connection to any potable water system. The proper system design, maintenance and use are the responsibility of the building owner. The acceptability of water conservation systems as an alternate method of construction are contingent on construction meeting the following conditions:

1. Except as otherwise provided for in this alternate method, the provisions of the Oregon plumbing code shall be applicable to water conservation installations. The alternate use of water conservation systems are in addition to the other requirements of the Plumbing Code.
2. The type of system shall be listed to the IAPMO IGC 207-2006 or CSA B128.1-2006 standard or be listed by an American National Standards Institute (ANSI) accredited product listing program. The system, except as otherwise approved, shall consist of a holding tank or tanks, pump, and automatic chemical treatment device.
3. All piping and plumbing component materials and products used in the installation of a water conservation system shall be as approved for the specific use in the Oregon Plumbing Code or be listed by any ANSI accredited product listing program.
4. No water conservation system or part thereof shall discharge water outside of the building served unless approved by the Oregon Department of Environmental Quality.
5. System components shall be properly identified as to the manufacturer.
6. Installation shall conform with the equipment and installation methods identified by the manufacturer and product listing.
7. A flow test shall be performed through the system to the point of water conservation use. All lines and components shall be watertight.
8. Holding tanks shall be installed per the manufacturer's installation instructions and listing and shall be secured or anchored against overturning. Holding tanks shall be filled with water to the overflow line prior to and during inspection. All seams and joints shall be left exposed, and the tank shall remain watertight.
9. Each holding tank shall be vented as required by Chapter 9 of the plumbing code and shall have a locking, gasketed access opening or approved equivalent to allow for inspection and cleaning.
10. Each holding tank shall have its rated capacity permanently marked on the unit. In addition, a sign stating WATER CONSERVATION SYSTEM WATER, NON-POTABLE WATER shall be permanently marked on the holding tank. This signage is not required for the toilet tank
11. Each holding tank shall have an overflow drain. The system must be designed so that the tank overflow will gravity drain to the existing sewer line or septic tank. The tank shall be protected against sewer line backflow by a backwater valve. The overflow drains shall have a connection to the building drain or building sewer, upstream of septic tanks, if any. The overflow drain shall not be equipped with a shutoff valve.
12. The overflow drainpipes shall not be less in size than the inlet pipe. The vent size shall be determined based on the total drainage fixture units as outlined in Table 7-5 of the plumbing code. Unions or equally effective fittings shall be provided for all piping connected to the holding tank.
13. Each holding tank shall be structurally designed to withstand all anticipated loads.
14. Holding tanks shall be constructed of solid, durable materials not subject to excessive corrosion or decay both externally and internally by an approved coating or other acceptable means and shall be watertight. Holding tanks shall meet nationally recognized standards for the intended use; be listed by an ANSI accredited listing agency.

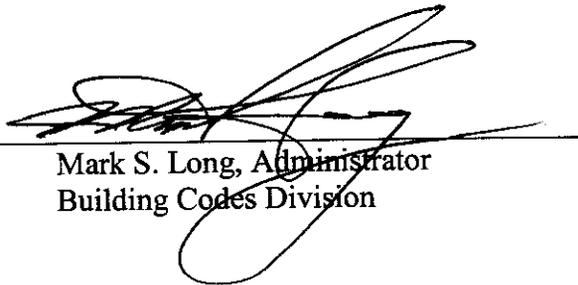
15. Holding tanks constructed of alternate material may be approved by the Municipality, provided they comply with approved applicable standards or are listed by an ANSI accredited listing agency.
16. All water conservation system piping shall be purple in color or be marked by a continuous purple tape, painted purple or be marked with the words NON-POTABLE WATER or with an equivalent international symbol. All valves, shall be accessible. A backwater valve installed pursuant to this code shall be provided on all holding tank drain connections to the sanitary drain or sewer piping.
17. Other collection and distribution systems may be approved by the local Municipality, as allowed by Section 301.0 of the plumbing code and this ruling.
18. Marking on pipe for water conservation systems shall be permanent, distinct, and easily recognizable.
19. All water conservation system piping shall be purple in color or be marked by a continuous purple tape, painted purple or be marked with the words NON-POTABLE WATER or with an equivalent international symbol.
20. Marking on piping shall be repeated at intervals of not more than five feet.



Universal Symbol for Non-Potable Water

CONCLUSION:

After considering the technical and scientific approval by the Oregon State Plumbing Board and the Residential Structures Board, the division rules that water conservation systems are acceptable as a construction method, subject to stated limitations, and Statewide Alternate Method Ruling No. OPSC 08-02 is approved.


Mark S. Long, Administrator
Building Codes Division


Date