



# Director's Rule 16-2018

<b>Applicant:</b>  City of Seattle Department of Construction and Inspections	<b>Page</b>  1 of 5	<b>Supersedes:</b>  N/A
	<b>Publication:</b>  10/30/2017	<b>Effective:</b>  05/03/2018
<b>Subject:</b>  Graywater Containment and Pumpout Requirements for Floating on Water Residences (FOWRs) and House Barges expanding by more than 120 square feet	<b>Code and Section Reference:</b>  SMC 23.60A.203, 23.60A.204	
	<b>Type of Rule:</b>  Code Interpretation	
	<b>Ordinance Authority:</b>  SMC 3.06.040	
<b>Index:</b>  Seattle Land Use Code	<b>Approved</b>	<b>Date</b>
	<u>(signature on file)</u> Nathan Torgelson, Director, SDCI	

## Issue

This Director's Rule clarifies the graywater containment and pumpout requirements that apply when a floating on-water residence (FOWR) or house barge is expanded by more than 120 square feet and the owner chooses not to hook up to the City's waste-water disposal system. The Seattle Shoreline Master Program Code (or Shoreline Code) does not provide a specific method for calculating the required graywater storage capacity, so there is a need to clarify the requirements. This Rule also applies when a FOWR or house barge is replaced and the new residence is more than 120 square feet larger than the verified FOWR or house barge. This Rule does not apply to FOWRs or house barges that are not expanding or whose total expansions over the life of the FOWR or house barge are less than 120 square feet.

## Seattle Shoreline Master Program (Code or Shoreline Code) requirements:

For FOWR and house barge expansions greater than 120 square feet over the life of the FOWR or house barge, the Shoreline Code requires one of two options: either graywater containment or a waste-water hookup that disposes the graywater to the City's waste-water disposal system. See Seattle Municipal Code 23.60A.203C.1.e.5 for FOWRs and SMC 23.60A.204.C.1.e.5 for

house barges. The Code does not provide direction for calculating the required graywater storage capacity should the owner choose the containment option, and it does not specify pumpout schedules or describe approved ways of ensuring the graywater does not enter Seattle waters.

### Impacts of graywater

Graywater is water that has been used for bathing, cooking, dishwashing, laundry, and similar activities, and discarded. It may be contaminated with body fluids, food waste, soap, detergents, household cleaning materials, or anything else that passes through the kitchen, bathroom, laundry, or other drains on a floating residence, with the exception of toilet water. Most FOWRs and house barges are moored on Lake Union or along the Ship Canal and discharge graywater directly into these waters. Graywater can contribute to undesirable bacterial growth in the water, add materials that act as nutrients for weed growth and decrease oxygen, and introduce chemicals that are unhealthy for fish, plants, and wildlife. As a result, graywater discharges are prohibited in some jurisdictions. Oregon requires all floating homes and other floating residences that do not move to be hooked up to a waste-water sewer system. SDCI reviewed studies done for the inland lakes of British Columbia, a houseboating region in Australia, and Shasta Lake in California. These studies all confirm that although dilution of graywater can minimize impacts, locations where many houseboats or liveaboards are moored often exceed water quality limits on bacteria and pollutants.

### Graywater treatment as alternative to code requirements

Treatment of graywater before discharge has been suggested as an alternative to the Code requirement of hooking up to sewer or containing (and then pumping out) graywater. This alternative is not authorized by the Seattle Shoreline Master Program, so it cannot be used to meet graywater requirements for expansion. FOWRs and house barges that have not expanded beyond 120 square feet, and any vessels that discharge graywater directly to the waters of Seattle may choose on their own to use graywater treatment systems, and doing so might help limit graywater impacts on the aquatic environment. SDCI does not regulate graywater treatment.

### Pump-out facilities

SDCI spoke with three mobile pumpout services that operate on Lake Union. Sanitug has a capacity of over 300 gallons. SS Head can carry about 500 gallons. Pump-me-out can take at least 350 gallons per trip. With increased market demand for more capacity in the pumpout boats, SDCI would expect the pumpout companies to respond.

Conversations with land-based pumpout companies showed that the options for pumping out to a truck would be limited, but they do exist. The pumpers confirmed that their services can be expensive, but a larger holding tank on board a FOWR or house barge that needed less frequent pumpouts could lower costs. Several pumper truck companies said they did not plan to nor desire to pump from floating residences, but acknowledged it would be possible. There are six pumper truck companies licensed in King County for pumping out vessel holding tanks.

### Calculation of Graywater Production:

For residences connected to City sewer, including floating homes, indoor water use in the City of Seattle has been calculated by Seattle Public Utilities (SPU) at 47 gallons per person per day.

FOWRs and house barges have characteristics similar to on-land residences. One difference, however, is that toilet water, known as blackwater, is diverted to blackwater holding tanks and pumped out. Based on this, water use should be adjusted downward by 24% to account for water used by toilets. The SPU calculation for indoor residential water use without toilet use would be 47 gallons per person per day less 24%, or 35.72 gallons per person per day.

Because residents of FOWRs and house barges live over the water, data about graywater production on vessels are also relevant. Several studies provide standard calculations for graywater production by crew and passengers aboard vessels based on duration of occupancy. This includes graywater from galleys, showers, and sinks. The water usage proposed by SDCI in a draft of this rule is slightly less per person than the usage calculated by SPU for indoor residential water use: 113.6 liters or 30 gallons per person per day.

In response to the comments received SDCI reviewed additional information from the US EPA on vessel graywater generation, and from British Columbia, Australia and California, where studies have been done specifically on houseboat graywater.

The US EPA study looked at graywater discharges from vessels<sup>1</sup> and reported graywater generation rates in response to an EPA cruise ship survey in 2004. The rates ranged from 36 to 119 gallons/day/person, with an average of 67 gallons/day/person for large cruise ships.

The EPA study also pointed to a report from the Baltic Marine Environment Protection Commission, which found that cruise ship graywater generation is approximately 120 liters per person/day (32 gallons/day/person), and an Ocean Conservancy estimate of cruise ship grey water generation ranging from 114 to 322 liters per day (30 to 85 gallons/day/person).

One perhaps more comparable source about graywater production is found in the Lake Eildon (Australia) Houseboat Graywater Review, Final Report 29 March 2017.<sup>2</sup> It referenced, at page 71, graywater production at 130 Liters (34 gals) per person per day and also referenced graywater production of 120 liters (32 gals) per person per day, citing to Lloyd's Register Rule and Regulations for the Classification of Ships. The British Columbia study<sup>3</sup> cites to graywater production of 150 liters (40 gals) per person per day (page 49) but notes that minimizing water use could reduce graywater production to about 100 liters (26 gals) per person per day. (page 64). This study even speculated that production as low as 60 liters (16 gals) per person per day was possible. (page 64).

SDCI assumes that FOWR and house barge residents use best practices and use less water per day than an on-land resident. Therefore, SDCI will generally use 26 gallons per person per day as the minimum required graywater containment for FOWRs and house barges that expand by more than 120 square feet.

---

<sup>1</sup> [https://www3.epa.gov/npdes/pubs/vgp\\_graywater.pdf](https://www3.epa.gov/npdes/pubs/vgp_graywater.pdf) see page 6.

<sup>2</sup> [https://www.gmwater.com.au/downloads/gmw/Houseboats/20170512\\_Jacobs\\_Final\\_Report\\_on\\_Eildon\\_Houseboats\\_Greywater\\_Review\\_-\\_29\\_March\\_20.pdf](https://www.gmwater.com.au/downloads/gmw/Houseboats/20170512_Jacobs_Final_Report_on_Eildon_Houseboats_Greywater_Review_-_29_March_20.pdf)

<sup>3</sup> See Shuswap Lake study referenced previously in footnote 3

### Number of Residents per floating residence

Although FOWRs and house barges can accommodate different numbers of residents, SDCI must have rules that can be applied consistently and that are able to accommodate changing circumstances. Rather than try to estimate how many people will live now and in the future on a floating residence that has expanded, SDCI will set the graywater containment standard based on two residents per expanded FOWR or house barge. This will be modified to allow tank sizing for a single resident if the expanded FOWR or house barge has 320 square feet or less of living space. For large FOWRs and house barges an additional person will be assumed in calculating containment requirements. Tank sizing will be based on an assumption of weekly pumpouts.

### Verification of Pumpouts

Quarterly verification that graywater is being pumped out rather than discharged into the water will be required. Verification may be achieved by sending pumpout receipts or in another fashion as approved by the director.

### **Rule**

When a FOWR or house barge applies to expand by more than 120 square feet and the applicant chooses not to hook up to the City waste-water disposal system, the expansion must include graywater storage capacity of at least 26 gallons per person per day. Weekly pumpouts are assumed. For FOWRs and house barges with 320 square feet or less of living area, a minimum of 182 gallons of graywater storage capacity is required. For FOWRs and house barges greater than 320 sf in size but less than 1280 square feet, 364 gallons of storage capacity is required. For FOWRs and house barges greater than 1280 square feet, an additional 182 gallons of graywater containment is required for a total of 546 gallons.

Expanded FOWRs and house barges with required graywater containment shall submit quarterly verifications to SDCI showing their graywater has been pumped out frequently enough to prevent graywater discharge to Seattle waters.