LeapFrog Design

Estuary™
Residential Greywater Reuse System

Installation Manual

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Contact Information

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Contents

Safety

Read this manual before installing and or using the Estuary system.

The Estuary system should only be serviced by authorized technicians. Risk of electric shock may occur. Always disconnect the Estuary system from the main power supply before servicing or maintenance.

The Estuary system supplies NON-POTABLE water. DO NOT drink recycled water.

Recommendations

- The Estuary should always be accessible for servicing and maintenance.
- Never use greywater from kitchen sinks or dishwashers. See the Limitations section below for more information.

Responsibility and liability

Manufacturer

LeapFrog Design warrants the proper working of the system according to its general sales conditions. LeapFrog Design is not liable in the following cases:

1. Failure to follow instructions for installation and maintenance of the Estuary.
2. Failure to follow instructions for use of the Estuary system.
3. Inadequate or insufficient maintenance of the Estuary system.

Installer

The installer is responsible for the installation and initial commissioning of the Estuary.

1. The Estuary system should always be installed according to local regulations and standards.
2. Perform initial commissioning and necessary check.
3. Explain the installation to the owner/user.
4. Handover all manuals to the owner/user.

Owner/User

To ensure optimal functioning of the Estuary system, please observe the following:

1. Read and follow the instructions for operation of the Estuary system.
2. Request assistance of a qualified installer for installation, commissioning, servicing, and maintenance.
3. Ask the installer for an explanation of the installation.

Introduction

The Estuary Residential Greywater Reuse System is designed to reduce household water consumption. It collects gently used greywater from sinks, showers, and washing machines and recycles it for toilet flushing and garden irrigation. The Estuary is the only living, modular ecological water treatment system powered by the biological systems of natural wetlands and the purifying properties of volcanic soils to clean and recycle water for reuse in the home and garden.

Natural beauty & functionality

Powered by biological wetland systems and purifying volcanic soils in a stylish raised-bed planter.

Industry-leading quality

Designed to exceed NSF 350 international water quality standards for safe reuse in your home and garden.

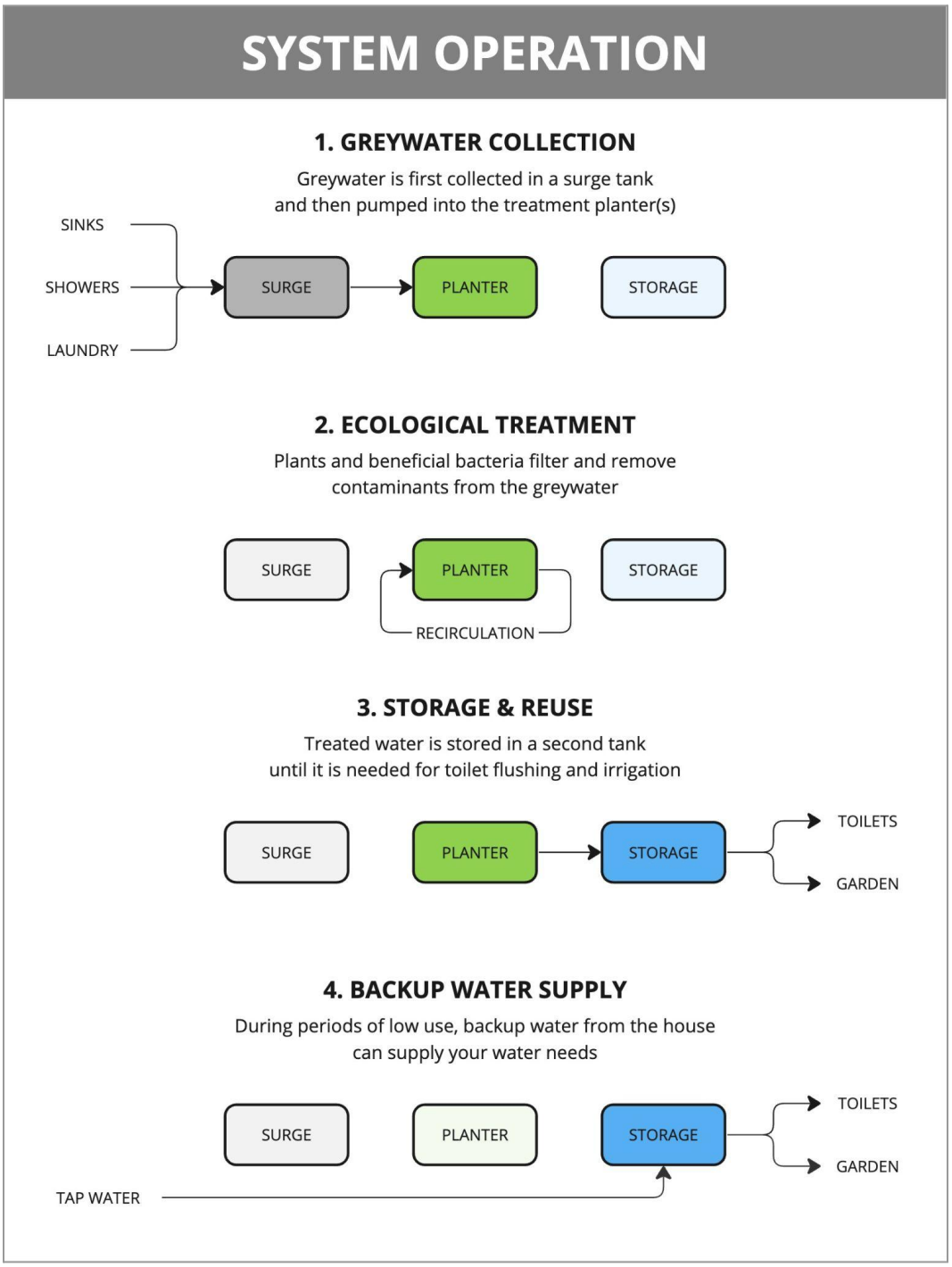
Real-time monitoring

Monitored 24/7 to optimize treatment performance, ensure water quality, and check for maintenance.

System design

Components

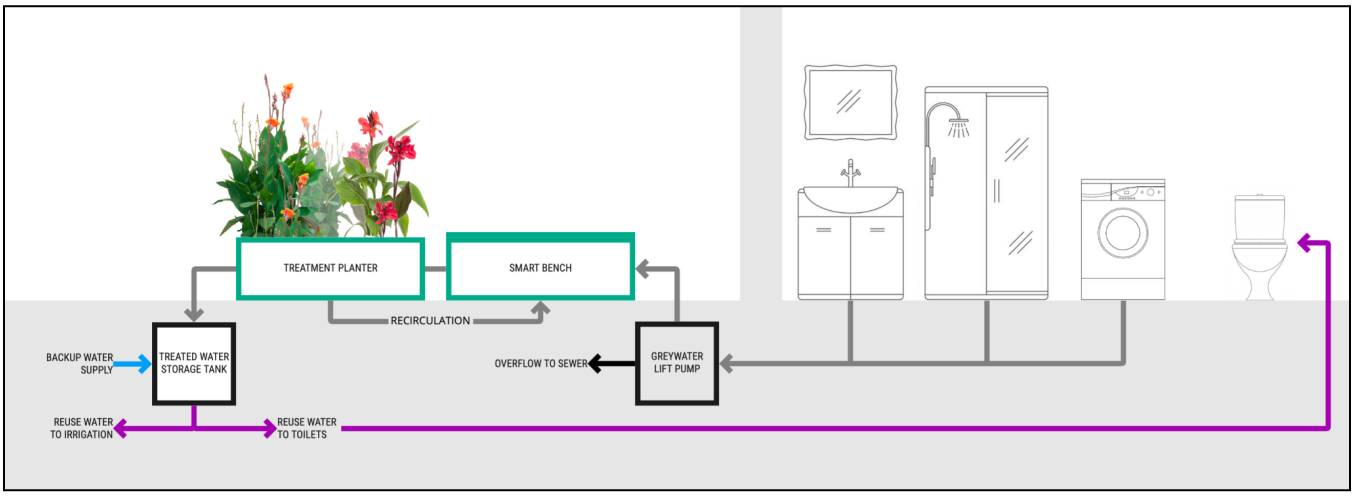
- One smart bench that receives greywater and holds it temporarily until it can be treated
- One or more treatment planters that filter and remove contaminants
- One or more storage tanks that store treated water until it's needed for toilet flushing or irrigation
- A lift pump for supplying household greywater to the Estuary system
- A distribution pump for supplying recycled water to toilets and irrigation



Requirements

The Estuary system requires the following:

- a greywater inlet from bathing water and/or laundry water sources
- a recycled water outlet
- a connection to backup water supply
- a connection to sewer
- a connection to electrical power
- a connection to WiFi with a 2.4GHz band (b, g, n, ax, be)



Off-loading and unpacking

The Estuary system will be transported on a standard shipping pallet with protective plastic film and cardboard edge protectors. The individual bench and planter containers may be stacked together on a single pallet.

The containers are less than 50 pounds each and may be safely carried by two people. When moving the containers, handle them with care and keep them in an upright, vertical position. Once they are in their final installation location, remove the protective film.

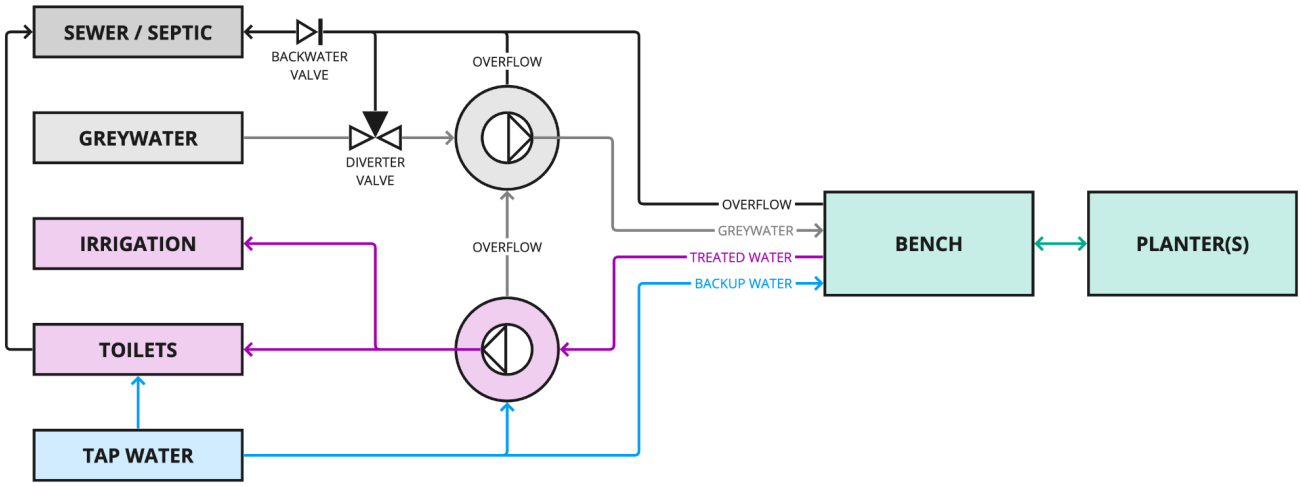
Bags of filtration media may be packed within the containers during shipping. These should be removed before attempting to carry the containers. They can then be emptied into the planters according to the instructions below.

Installation preparation

Always check that the system and installation comply with country, state, and local regulations and standards.

In the case of new construction, we strongly recommend installing the Estuary system *only after* the building process is complete to prevent accidental damage to the system and to prevent building debris and chemicals from entering the system.

Household plumbing and electrical connections



Power supply

120 VAC 20-Amp power supply with 4” square junction box.

A GFCI-protected circuit is required.

Greywater connection

Supplies untreated greywater influent from the house.

Use only shower, bath, bathroom sinks, and laundry water as source water. Do not supply wastewater from kitchen sinks, dishwashers, or toilets to the Estuary system.

Connect all separated greywater pipes to a single 1.5” stub-out in the valve box.

1.5”–2” ABS or PVC pipe.

Inlet depth may vary from 12” to 24” below grade.

Greywater diverter valve

Diverts greywater to the treatment system or back to the sewer.

Model: Jandy 4715 3-port 1.5 to 2-inch Gray Valve/Pool Valve

If there is no diverter valve, the greywater pipe should connect directly to the sewer connection.

An optional electronic greywater diversion valve actuator allows the diverter valve to be controlled from a toggle switch installed outside or inside the house.

Model: Jandy 2444 4424 Pro Series 24V Valve Actuator JVA 180 Degree

Requires a 24 VAC power supply and single-pole dual-throw (SPDT) toggle switch.

Greywater lift pump

If the Estuary system is at or above the same level as the greywater sources, an appropriate lift pump must be installed to transfer the greywater to the 1” inlet of the Estuary system.

An ideal place for the lift pump is within the plumbing box or a separate adjacent box.

Sewer connection

Drains excess greywater from the house and treatment system to sewer.

2” ABS or PVC pipe.

Pipe should be 18” below grade.

Backup water connection

Supplies fresh water from the main tap when recycled water is unavailable.

3/4" PEX blue pipe recommended.

With the Greywater Compatible configuration, a temporary connection can be installed to provide backup water directly to the toilet(s) and irrigation system until the Estuary system is installed and operational (see configuration above).

When upgrading to the Greywater Ready configuration, a dual-check valve / backflow preventer must be installed between backup water pipe and recycled water pipes along with a bypass valve.

Recycled water connection to toilet

Supplies recycled water for indoor toilet flushing.

If backup water is available, this connection may replace existing plumbing (i.e. the toilets do not need to be dual-plumbed).

3/4" PEX purple pipe recommended.

Recycled water connection to irrigation

Supplies recycled water for outdoor irrigation.

3/4" PEX purple pipe recommended.

Terminates with a 3/4” garden hose thread (GHT) brass spigot/valve for connection to the irrigation system (not provided).

Recycled water distribution pump

Within the plumbing box or a separate box, the distribution pump supplies recycled water to toilet and/or irrigation connections.

Pump must be capable of supplying 15 PSI (45 max).

Groundwork

Prepare a flat, level base where the containers will go. Roughly 2’ x 4’ per container.

Recommended base: 4 inches compacted crushed rock or concrete slab.

Treatment system plumbing connections

The treatment system has 4 connections to the plumbing box:

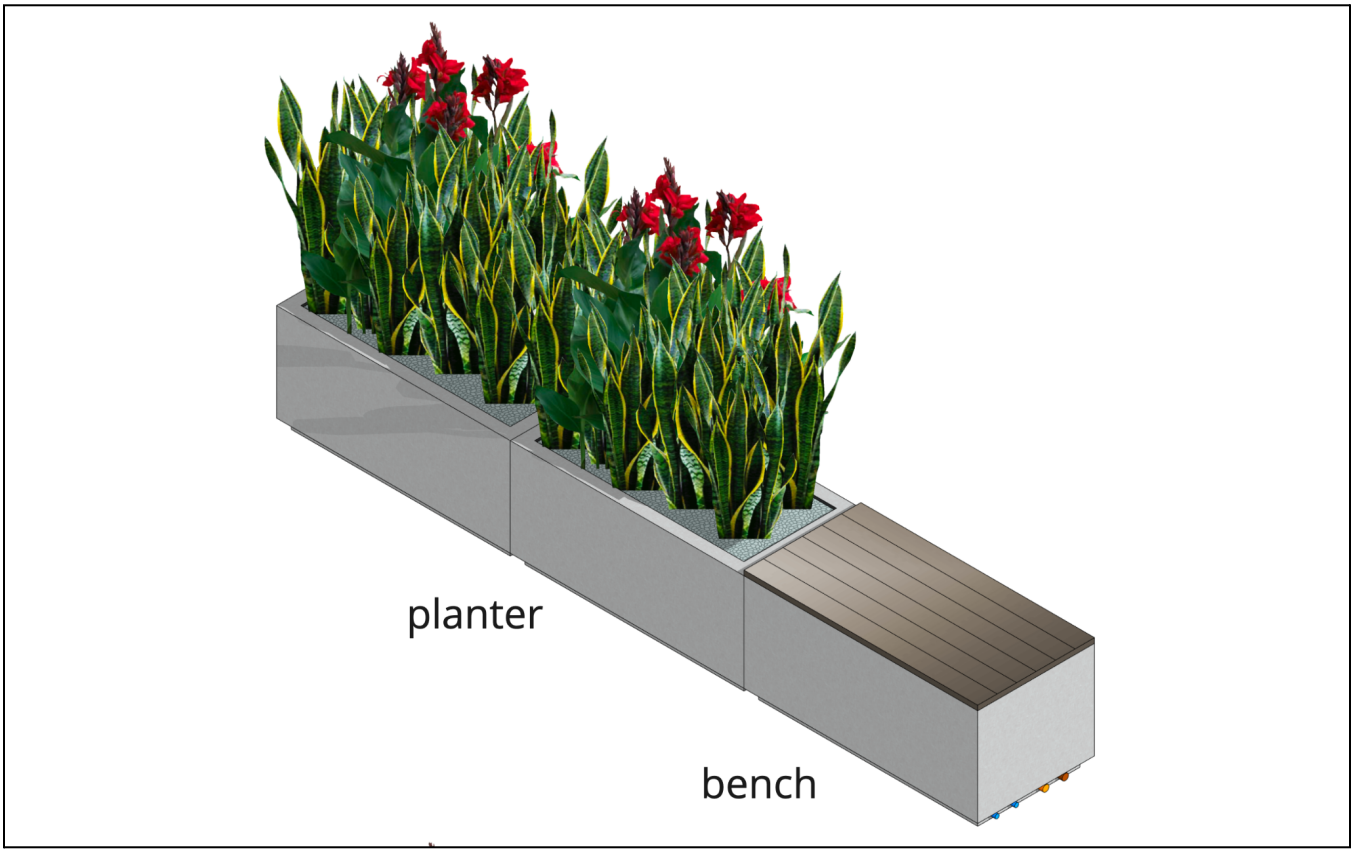
Greywater inlet = 1” PVC

Greywater overflow outlet = 1” PVC

Recycled water outlet = 1/2" PVC

Backup water inlet = 1/2" PVC

Container assembly



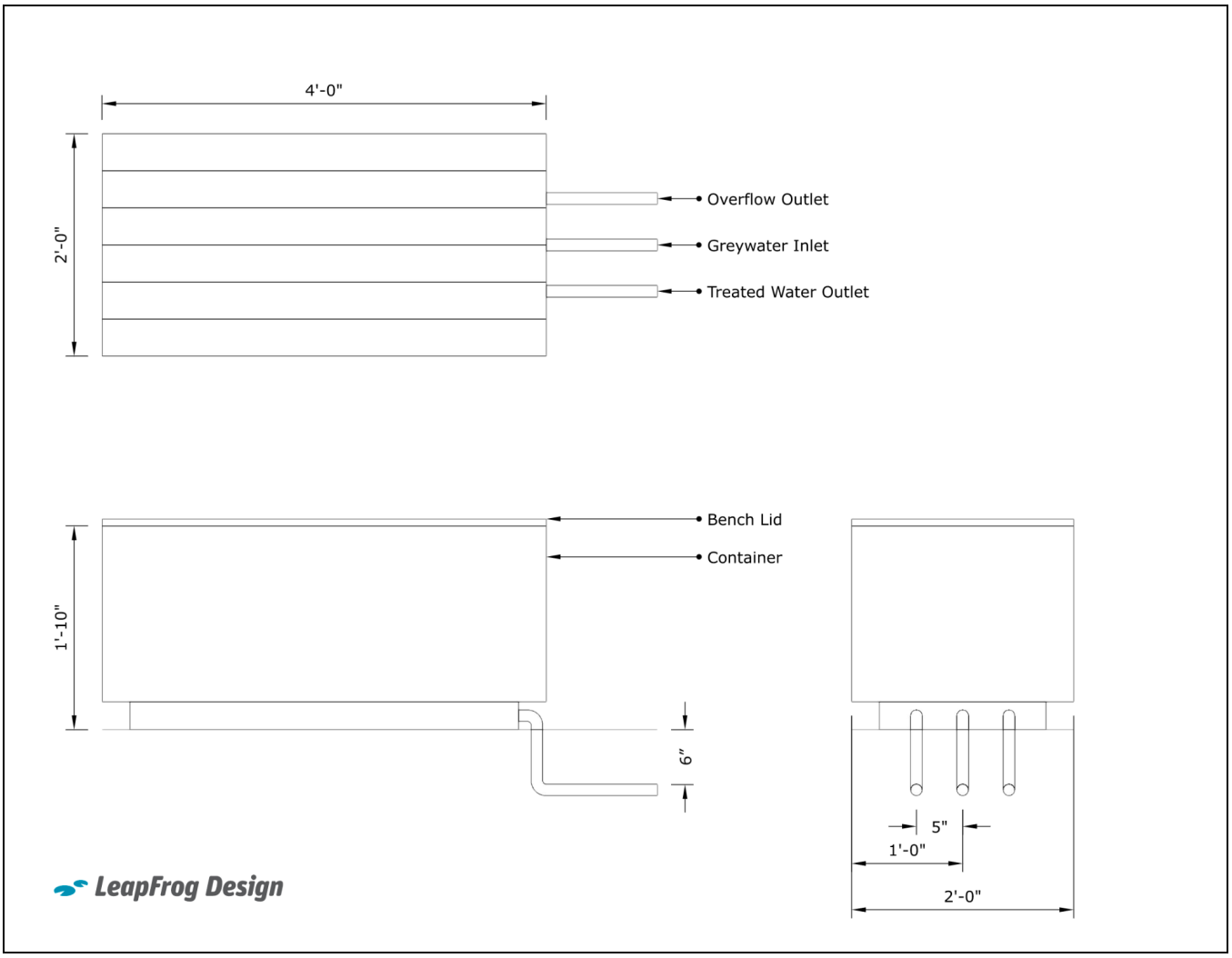
Bench module

The bench receives greywater from the house, distributes it to the planters for treatment, and sends the recycled water to storage. The bench contains the surge tank, pumps, valves, controls and monitoring system, and the final polishing system.

Set the bench on the prepared base closest to the plumbing connections.

Connect the inlets/outlets to the corresponding pipes.

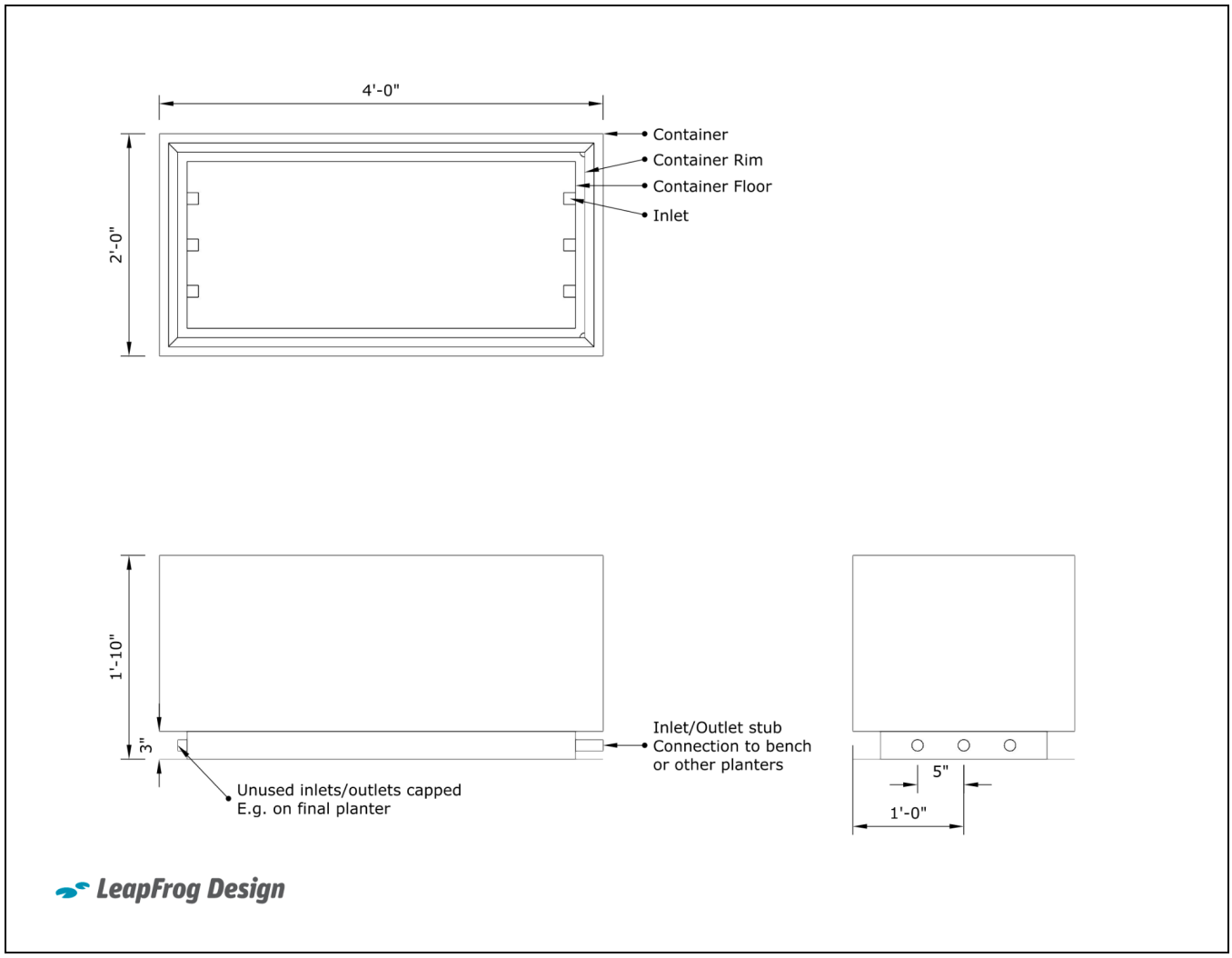
Connect the power cord to the GFCI outlet in the plumbing box or to another GFCI-protected outdoor-rated power outlet.



Planter module(s)

The planter module provides filtration and ecological treatment of the greywater.

Set the planters on the prepared base beside the bench. Align the corresponding inlets/outlets and join the connections with supplied fittings.



Planting

Filtration media

Warning: *Use only the filtration media supplied by LeapFrog Design.*

Fill the planters with the filtration media until it reaches the top of the baffles in the container (about 6 inches from the top of the planter).

Add water to planters until the filtration media is saturated. With the planters full of filtration media and water, gently tap the sides of the containers to help the filtration media settle into place and fill any empty corners. The filtration media may sink lower. Add more media back to bring it back up to the 6 inches mark.

Plants

Warning: *Plants must be promptly planted into the Estuary system upon arrival. Failure to do so may result in stunted growth or death of the plants. If immediate planting is not possible, place the plants out of direct sunlight and ensure adequate and consistent water. Plants stored in this way must be planted within 3 days.*

Remove the plants from their pots and protective packaging and arrange them in the planter according to the arrangement in the **Planting Plan** (provided separately).

Once all the plants are in the planter, use the remaining filtration media to fill in around the roots. The final level of the filtration media should be about 1" lower than the top of the planter. Adjust the plants so they are all upright and stable. Trim and remove any damaged leaves or stems.

Startup and commissioning

Power

Ensure that all pumps, sensors, and electrical devices are plugged into the Contol Unit.

Turn on the treatment system via the main power switch located on the Control Unit.

Test each pump by toggling its power switch briefly to "on" and checking for functionality. Reset it back to "auto."

WiFi Setup

1. Ensure the treatment system is connected to power and turned on.
2. Go to the Wi-Fi settings on your phone or computer and join the network named LFD-###-###
    a. If the network does not appear after 1 minute, briefly press the wifi reset button on the control box and try again.
    b. If the device still does not appear after 1 minute, reset power to the treatment system and refresh the home WiFi network.
3. Once connected to the network, you will be automatically redirected to a Wi-Fi portal.
    a. If you are not directed to this portal after 30 seconds go to the following address on your device: http://192.168.4.1/wi?
4. Within the WiFi portal, input the SSID and password of your existing home WiFi network and select "confirm". The treatment system will now connect to the network. If a "success" message appears you can close the portal. Otherwise, input the username and password again ensuring they are correct.

Commissioning

The Estuary needs a few weeks to develop the ecological treatment process and become fully operational. To accelerate this process, add the packets of fertilizer and beneficial bacteria (supplied separately) into the recirculation chamber within the Bench.

Post-installation tasks

- Ensure all switches on the control box are set to the "auto" position.
- Close the bench lid.
- Contact LeapFrog Design to confirm the successful installation
- Provide the Owner's Manual to owners.
- Provide post-installation survey to LeapFrog Design.

System malfunction

The Estuary continuously monitors itself and reports its status to the remote monitoring server via WiFi. In the unlikely event that a component fails, the device will pause treatment and send a warning message to the remote monitoring server.

Warning: *The device is designed for 'normal usage' and is not designed to receive abnormal solid materials like stones, or chemicals, paint residues, hair dye, bleach, and disinfectants or any other matter that is unusual for bathing or laundry water. In the event these substances enter the device, the system itself can be damaged and the ecological water treatment process can be disrupted. LeapFrog Design is not liable for any damage if the above or any other abnormal substances enter into the device.*

Do you need assistance? *Contact technical support at support@leapfrog.design*

Maintenance

We recommend a check performed by a LeapFrog Design accredited technician once every year.

This check may contain the following elements:

- Collecting samples of treated water for testing and reporting to local agencies (if required).
- Pruning and weeding the planter(s) to maintain optimal appearance.
- Adding beneficial bacteria to maintain ecosystem health.
- Inspecting pumps, sensors, and other mechanical components for damage.
- Inspecting containers and plumbing for leakage.

Planters

In certain climates, annual pruning of the plants may help maintain the overall health and beauty of the system.

Fallen debris such as leaves and pine needles may accumulate in the planter. This has no effect on system performance but can be cleaned out for aesthetic considerations.

Winter weatherization

In colder climates, the device and its connected plumbing may need to be drained to prevent damage from freezing temperatures.

Warranty

See your **Product Warranty** for more information.

Specifications

Dimensions

The bench and planter modules are sized 48 in x 24 in x 22 (LxWxH).

Materials

The module walls are made of glass-fiber reinforced plastic (GFRP).

Plumbing components are made of PE, HDPE, PVC, and ABS.

All other component materials per manufacturer specifications.

Power supply

120 VAC, 20 Amp

Estimated power consumption

±200 kWh/year

Average recycled water quality

The Estuary system has been designed and tested to meet the NSF/ANSI 350 standard for residential greywater reuse:

- CBOD5 < 10 mg/L
- TSS < 10 mg/L
- Turbidity < 5 NTU
- E. coli < 14 MPN/100 mL
- pH 6.0 – 9.0

Noise level

+30 dB