Rain Garden Planter Project
A collaboration between Stewardship Partners and the Seattle Garden Club

Goal
This project was undertaken as a demonstration and proof of concept in order to provide improved guidance, based on direct experience, for how to create a successful rain garden planter in the Pacific Northwest. A typical rain garden is dug into the ground and requires an amount of space that is not always available especially in highly urban contexts where polluted runoff poses the greatest threat. A rain garden planter can provide water quality and volume control benefits in a relatively compact size. They can also be attractive landscape features, tailored to fit many different tastes.

Overview
This project was an exploration of existing design options from multiple sources and not everything we tried worked. The first version of the planter did not allow water to pass through it as quickly as hoped and so the soils, plants and textile (weed fabric) were removed, and new drainage rock, screen material, sand and soils went back in following the basic guidance laid forth by the Port of Vancouver (WA) in their “Grattix” design developed for industrial scale stormwater planters. The Grattix design provided the desired outcome for all parties of: steady drainage rates, adequate soil moisture retention to support the desired plant community, and aesthetic beauty. Below is a condensed description of the methods that proved successful.

Site Context
Assessing a site in terms of soils, existing structures and stormwater systems and of course property owner needs and desires, is the most important part of any successful project. Because no two sites are identical, there is no one-size-fits-all recipe. Here we describe the specific context for this demonstration project as an example of the site assessment that we conducted prior to choosing a rain garden planter as a good and feasible option.

The residence is located on a slope about 150 feet and one residence back from the shores of Lake Washington, Seattle.

The container used for this project was 6’ long x 24” deep x 24” wide galvanized trough by Tarter. This container had a FLAT bottom and did NOT have any rim or lip around the bottom edge. This Tarter galvanized trough had a water outlet at the base which was used for the filtered rain garden water to exit the container.

The container location at the residence was about 14” inches from a roof downspout and about 6” away from the house slab (no in ground basement). The roof (Contributing area) size for this downspout was estimated to be about 200 square feet.
Steps
Preparing the site and setting the container

1. Measure out and mark area adding an additional 4” beyond the size of your container.

2. Dig out base, about 4” deep.

3. Pour in gravel (Paver Base aka crushed rock aka 5/8 minus) to about 2” deep and level it. Tamp down the gravel (we used our feet but a hand tamping tool is ideal).

4. Lay cement pavers to support the base of your container. If your container DOES NOT have a rim/lip on the bottom, set the pavers to stick out about ½” beyond your container. If your container DOES have a lip/rim on the bottom, set the pavers so that the rim lands squarely in the middle of the pavers for better support. For our container, which had a flat bottom, no lip, we used six 6” x 12” cement pavers. Set and tamp down pavers.

5. Level site/pavers, both length and width favoring a slight tip to the draining side (away from the house) if anything.

6. Place container on pavers, adjust paver positions and check length and width levels again.

7. Remove container and fill in site with additional Paver Base gravel to the top of the pavers. The goal is to have the full base of your container supported by the paver base gravel with additional support around the edges by the pavers. Alternatively, the whole base could be covered by pavers which is slightly more expensive and slightly more labor intensive than the method we followed.

8. Tamp down gravel, fill in with additional gravel as needed to reach the top of the pavers. Tamp again. Sweep off pavers as any gravel or debris will skew your levels and seating of your container.

9. Check levels (again) length and width with. We allowed for a very slight tip away from the house as an additional security measure so that if the overflow structure ever fails, the planter would still overflow away from the house.

10. Set container on pavers and adjust to set (with flat bottom) or seat (with rimmed bottom) properly. If your container has a rim on the bottom, you may need to wiggle it a bit to seat it properly in the gravel for full bottom support if not using pavers.
11. Shim if necessary using PLASTIC shims - wood will rot and compress, possibly impacting the drainage slope over time. Check length and width levels (yes, again).

Preparing the container for water overflow and outflow

Dry fitting the overflow outlet

12. Establish the closest point from downspout to the edge of your container. A 1” PVC pipe with a 90 degree fitting was used for the water overflow in this case and the overflow goes back into the same stand pipe connected to the side sewer here (other options are possible depending on existing site conditions).

13. Measure down about 2” from top of container and mark this spot. This will be the TOP of the water outlet hole to be drilled through the wall of your container.

14. Drill hole in wall of container (use a hole saw drill bit with tapping bit inserted in the center of the same diameter as the outer diameter of the pipe).

15. Use rasp file to clean metal edges and dry fit overflow pipe through the drilled hole of the container extending the pipe to the downspout. Test the geometry to ensure water will flow downhill away from the container.

Inside the container - Preparing the base, perforated pipe and outflow

16. Prior to installation prepare the 3” PVC perforated pipe and outlet pipe. Measure the interior length of your container. Make the PVC pipe as long as possible, allowing for the additional space needed for the caps. Cap ends by tapping on firmly.

17. Set capped perforated pipe in the bottom of the container. Starting from the outside of the container, push the 3/4” threaded pipe in through the container outlet hole to the widest point on the perforated pipe, creating a “T”. Mark this spot.

18. Using the corresponding hole drill bit (aka “hole saw”) with tapping bit inserted in the middle, drill a hole in the perforated pipe. Clean off drill debris with rasp or sandpaper. Test hole size with 3/4”pipe. Adjust accordingly. We threaded a metal male hose adapter into the perforated pipe to create threads to attach the 3/4” outlet pipe. This step is not necessary though is does provide a more secure connection. DO NOT SECURE 3/4” PIPE TO PERF PIPE YET!
Remove all pipes from the container before continuing

19. Pour clean drainage rock into the base of the container to a depth of 1 inch. Spread evenly.

20. Lay perforated pipe on top of drainage rock with outlet pipe hole facing towards drain hole. (in our first try, we wrapped the perf pipe in filter fabric, which actually prevented the planter from draining as quickly as we wanted it to).

21. These next steps take some adjusting. Insert 3/4” pipe from outside the container through the outlet drain hole and dig out ground on the exterior of the container to provide a downhill runoff from interior to exterior. Twist into the 3/4” hole in the perforated pipe.

22. Outside of the planter we used a downspout splashblock for dispersion and covered it with 2-3” river rock to prevent erosion and it looks nice! Check again to make sure outlet pipe is sloping downhill. Seal around container drain hole, inside and outside with a good outdoor silicone caulk; we used “Through the Roof” brand.

23. Add additional drainage rock, just enough to cover the perforated pipe and spread evenly.

24. Cover drainage rock fully with a layer of “pet-proof” window screen material, allowing any excess to run up the sides creating a “bowl.” This keeps pea gravel from sifting down into the drain rock layer and possibly clogging the drainage rock or perforated pipe.

25. Add a layer of pea gravel on top of the window screen. Spread evenly.

26. Cover pea gravel fully with another layer of pet proof window screen.

27. Add a layer of sand on top of the window screen. Spread evenly.

28. Add soil. We used Cedar Grove Topsoil which has a small amount of sand in and mixed in an additional 55-60% of all purpose sand. The ideal mix should be 60% screened sand and 40% good quality compost (certifications are good to verify compost quality) or if native soils at the site are known to drain well, you can mix 65% native soil together with 35% compost by volume. Tamp down with hands, not too fluffy nor too compact. Water lightly to aid with settling the soil and avoid future unexpected settling. Add remaining dirt and tamp down with hands. There should be at least 6 inches from the bottom of the overflow
structure to top of the soil to allow for water to pond during heavy rains without overflowing the container.

Setting the Inflow and the Overflow

30. Cut downspout with sawzall or hack saw at a point about 4-6 inches above the top of the container. Remove downspout (but you may want to use the downspout material later).

31. Attach downspout diverters with small set screws.

32. Set placement and angle of inflow.

33. Spread a small pile of river rock on top of newly placed soils inside the container under diverted downspout to disperse water and prevent erosion.

34. Install overflow pipes checking for downhill slope from container to downspout.

35. Place downspout mesh basket over the interior (in container) end of the overflow pipe to prevent leaves and larger debris from plugging/clogging pipe. Attach with wire or zip tie.

36. Plant plants

37. Add mulch (a woodchip mulch is recommended to retain moisture and suppress weeds—“beauty bark” is not recommended).
Project Materials

- 6’ x 24” x 24” Tater Galvanized water trough aka “container”
- Paver base gravel
- 6 - 6”x12” Pavers

Outflow Materials

- 3” x 10’ PVC perforated pipe cut to size
  - Plus two end caps
- 3/4” x 24” PVC pipe with threading (optional) on both ends for outflow. This pipe should fit as closely as possible through the outlet plug of the container making is easier to caulk and seal.
  - Note: Threads in the perforated pipe made to match the threaded end of the 3/4” outlet pipe were created with a metal male hose adapter. This is an optional step. The other threaded end of the pipe (outside the container) had a metal female to male hose adapter attached allowing for a hose to be attached if moving outflow water further away from the container is desired. The male portion of the metal female to male hose adapter can be used to create the threads in the perforated pipe.
- Teflon tape
- Plastic shims to level or minimally tilt container towards outflow drain hole - if needed
- 3/4” hole saw drill bit with tapping bit or pilot inserted in the center to drill hole into perforated pipe for outlet pipe
- Gutter splash guard

Overflow Materials

- 1” hole saw drill bit (use the same tapping bit, or pilot, stated above) to drill overflow hole through side of container
- 1” PVC pipe for overflow. Length depends on distance from inside container to downspout.
- 1” 90° elbow to attach to the downspout end of the overflow pipe
- Downspout mesh basket - “Gutter Strainer”
- Zip ties
- Silicone sealing caulk “Through the Roof” Excellent for outside use, UV exposure and being submersed.

Inflow Materials

- Downspout diverter and appropriate pieces and screws to bring downspout drain into center of container
- Sawzall or hack saw to cut downspout
- Self-tapping sheet metal screws (small) to secure downspout diverter to downspout
- Wood screws 1/2” - if needed to screw brackets to building to hold inflow downspout
- Cement Pavers - 6 pavers (6” x 12”)
- Pet-proof window screen: 2 rolls, at least 6’ x 24” each (or equivalent)
- Paver base gravel - 6 cf or 12 bags x .5 cf (1/2 cubic foot each bag)
- Pea Gravel - 4 cf or 10 bags x .5 cf (1/2 cubic foot each bag)
- 2” - 3” River rock - 8 cf or 16 bags (1/2/cubic foot each bag)
- Cedar Grove Top Soil 5 bags x 1 cf (1 cubic foot each bag)
- All-Purpose Sand (rinsed or screened sand if available) 8 cf or 8 bags (1cf/bag)
- 3 or 4 large river rocks for splash pad on top of soil.

Helpful Tools to Have
- Level - short and long
- Gloves
- Screwdrivers - flat and Philips head
- Rasp file to clean drill debris of PVC pipes and container hole
- Drill (and chuck if needed)
- Sawzall or hack saw
- Short and 1/2 inch self-tapping screws
- Rain Garden Handbook for Western Washington
- Grattix design instructions