Container Rain Garden: Titcomb Residence located on a slope about 150 feet and one residence back from the shores of Lake Washington, Seattle.

The goal is to use a container to create a rain garden instead of the typical in-ground depression to capture and filter impurities out of the roof/storm rainwater running off the homeowner's roof.

The intent is to provide an option to homeowners to create a rain garden when an in ground rain garden is not feasible.

The hope is that our efforts are successful!

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 and is the preferred design choice for a 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 about 200 square feet.

Be aware that the length and detail of these instructions may appear daunting, but much of this write up *is stating the obvious.* The detail is provided to alleviate any questions and allow you to create a beautiful and successful container rain garden.

Please read the instructions through to the end before starting this container rain garden project. You will see that while this project does require some level of skill and access to

particular tools, it is a fun and truly beneficial action you can take in cleaning the polluted storm/rain runoff that is finding its way into our streams, rivers, lakes and oceans.

Our hope is that you are inspired to lead by example and encourage your friends and neighbors to create their own in ground or container rain gardens. More information can be found at http://www.12000raingardens.org

Steps - preparing site and setting the container

1. Measure out area and mark (rebar here) adding an additional 4" beyond the size of your container
2. Dig out base to about 4" deep
3. Pour in gravel (Paver Base) to about 2" deep. Tamp down (we used our feet) and level
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 1/2 in 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 **L**ength and **W**idth favoring a *slight* tip to the draining side 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 (maybe) a *slight* tip to the draining side.
10. Set container on pavers and adjust to set (w/ flat bottom) properly. If your container has a rim on the bottom, and if you are not using pavers for the entire base, you may need to wiggle it a bit to seat it properly in the gravel for full bottom support.
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).

Steps - preparing the container for water overflow and out flow

Dry fitting the overflow outlet

12. Establish the closest point from downspout to the edge of your container. A 1" PVC pipe with a 90degree fitting was used for the water overflow. In this case, the overflow goes back into the same standpipe 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 using **(corresponding to hole drill bit with tapping bit inserted in the center.) I think it was 1" or 1 and 1/8?**
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…We want a downward slope here.**

16. Prior to installation prepare the 3" PVC perforation 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 perf 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 perf 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!**

19. Remove all pipes from the container

20. Cut filter fabric to allow for a double wrap on the perf pipe. Do not cut off excess "width" fabric

21. Wrap (roll) capped perf pipe in two layers of filter fabric. Tie off excess fabric on ends or secure them with wire or zip ties. Poke hole in fabric at connection for 3/4" outlet pipe.

22. Pour clean **pea** gravel, ***not paver gravel***, into the base of the container **to a depth of 1 inch**. Spread to even out gravel.

23. Lay perf pipe on top of gravel with outlet pipe hole facing towards drain hole

24. 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 perf pipe.

NOTE: We used a downspout splash block 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.

25. Add addition Pea gravel, just enough to cover the perf pipe and spread evenly.
26. Cover pea gravel fully with two layers of filter fabric allowing fabric to rise up the sides creating a “bowl.” This keeps the dirt from sifting down into the gravel and possibly clogging the pea gravel or perf pipe.

27. Add half of dirt. We used Cedar Grove Topsoil which has sand in it to allow for proper drainage speed. The ideal mix should be 60% 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 70% native solid together with 30% 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 about **6 inches** from top of container to top of soil to allow for water to pond during heavy rains without overflowing the container.

Setting the Overflow

28. Cut downspout with sawzall or hack saw at a point about 4-6 inches above the top of the container. Remove downspout (but keep this piece as you may want to use the downspout material later).
29. Attach downspout diverters with small set screws.
30. Set placement and angle of inflow
31. 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
32. Install overflow pipes checking for downhill slope from container to downspout

33. 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

34. Plant plants!

Materials used for this project

6' x 24" x 24" Tarter Galvanized water trough aka "container"

OUTFLOW

3" x 10' PVC perforated pipe aka "perf 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.

Threads in the perf 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 perf pipe.

Tephlon tape

Plastic shims to slightly cant 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 perf pipe for outlet pipe

gutter splash guard/spashblock

OVER FLOW
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” 90º 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
Downspout diverter and appropriate pieces (bracket?) 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** x 6” x 12”

Filter Fabric **6’ wide** (trench wrap fabric)

Paver base gravel - 6 cf or **12 bags** x .5 cf (1/2 cubic foot each bag)

Pea Gravel - 4 cf or **8 bags** x .5 cf (1/2 cubic foot each bag)

2” - 3” River rock - 2 cf or **4 bags** (1/2/cubic foot each bag)

Cedar Grove Top Soil (with sand) **12 bags** x 1 cf (1 cubic foot each bag)

Tools to have on hand:

Level - short and long

gloves

Screwdriver flat and philips head

Rasp file to clean drill debris of of PVC pipes and container hole

Drill (and chuck if needed)

Sawzall or hack saw

short and 1/2 inch self tapping screws

zip ties