

2.2.14 Planter Boxes



Description: Planter boxes are used on impervious surfaces in highly urbanized areas to collect and detain / infiltrate rainfall and runoff. The boxes may be prefabricated or constructed in place and contain growing medium, plants, and a reservoir.

KEY CONSIDERATIONS

DESIGN CRITERIA:

- Planter boxes should not be used for stormwater containing high sediment loads to minimize clogging potential

ADVANTAGES / BENEFITS:

- Filtration provides pollutant removal capability
- Reservoir decreases peak flow rates

DISADVANTAGES / LIMITATIONS:

- Intended for space-limited applications, or for areas requiring additional pollutant removal capability
- Limited data on pollutant removal effectiveness

MAINTENANCE REQUIREMENTS:

- Vegetation will require frequent maintenance
- Filter may require more frequent maintenance than most of the other stormwater controls

STORMWATER MANAGEMENT SUITABILITY

- S Water Quality Protection
- Streambank Protection
- On-Site Flood Control
- Downstream Flood Control

IMPLEMENTATION CONSIDERATIONS

- M Land Requirement
- L Capital Cost
- M Maintenance Burden

Residential Subdivision Use: No
 Hi Density/Ultra-Urban: Yes
 Drainage Area: 2 Ac. max.
 Soils: No restrictions

POLLUTANT REMOVAL

80%	Total Suspended Solids
60/40%	Nutrients – Total Phosphorous / Total Nitrogen Removal
No Data	Metals – Cadmium, Copper, Lead, and Zinc Removal
No Data	Pathogens – Coliform, Streptococci, E. Coli Removal

L = Low M = Moderate H = High

2.2.14.1 General Description

Planter boxes are essentially large pots filled with soil or other growing media. There are several variations of this basic design. The contained planter box receives only rainfall, which filters through the soil and is then either taken up by its vegetation or allowed to seep out the bottom of the planter to the pavement or sidewalk. The infiltration planter box can receive both rainfall and runoff, which eventually filters through the bottomless planter and enters the underlying soil. The flow-through planter box collects flow in a perforated pipe along the bottom of the box and discharges out the side of the planter or into a storm sewer.

Each of the three planter box types has certain advantages and drawbacks:

- The contained planter is not tied into underlying soil or pipes and can therefore be placed almost anywhere and moved when needed. However, it does not have a reservoir to provide additional storage for flow control. Care should also be used in placing it next to building foundations and heavy pedestrian traffic areas.
- The infiltration planter should not be used next to foundations and underlying soils must drain rapidly enough to avoid ponding.
- The flow-through planter can be used next to building foundations since it directs flow off to the side and away from the building. It must be located next to a suitable discharge point into the stormwater conveyance system.

2.2.14.2 Pollutant Removal Capabilities

Field tests of planters are lacking, however, tests of a bioretention cell by the EPA showed results that were generally similar to those of the Organic Filter, with somewhat less metals removal (43-78%).

2.2.14.3 Design Criteria and Specifications

- The infiltration and flow-through planter boxes can capture runoff from surrounding areas and provide limited storage in reservoirs. The ratio of planter area to impervious area should be 7%, assuming a storm volume of 1.5 inches and a reservoir depth in the planter of 12 inches.
- The planter should be constructed of stone, concrete, or brick. Pressure-treated wood may be used if it does not leach out toxic chemicals that might contaminate stormwater.
- Filter media should consist of sand, gravel and topsoil as shown in the figures below. As an alternative, compost/mulch can be used in place of the sand, gravel, and topsoil, but will have different infiltration characteristics. Compost with organics will aid in pollutant removal through absorption, but it will remove nitrogen as it breaks down/decomposes. A nitrogen fertilizer may need to be added should this occur.
- Planter vegetation should be relatively self-sustaining, with minimal fertilizer or pesticide requirements. Grasses, herbs, succulents, shrubs, and trees may be used in planter boxes. Examples include rushes, reeds, sedges, iris, dogwood, currants, and other approved species. Trees are encouraged as their foliage traps additional precipitation.
- All of the planters require 18 inches of growing media. The contained planter does not require a minimum width. A minimum width of 30 inches is recommended for the infiltration planter. The flow-through planter should be at least 18 inches wide. The minimum widths help reduce water wicking down the insides of the planter wall.
- Water should drain through a planter within 3-4 hours after the storm event.
- Soils underneath an infiltration planter should be SCS Hydrologic Type A or B.

2.2.14.4 Inspection and Maintenance Requirements

The inspection and maintenance requirements for planter boxes focus on maintaining an adequate drainage rate through the planting media and attractive and healthy vegetation.

Table 2.2.14-1 Typical Maintenance Activities for Planter Boxes	
Activity	Schedule
<ul style="list-style-type: none"> • Ensure that downspout or sheet flow from paving is unimpeded. • Ensure planter reservoir drains within 3-4 hours. • Replace or amend topsoil if drainage unsatisfactory. 	Quarterly and within 48 hours of major storms
<ul style="list-style-type: none"> • Ensure that contributing area and planter boxes are clear of debris. • Remove accumulated sediment if greater than 4 inches in depth. • Ensure that planter vegetation is healthy and planter is weeded and shrubs and trees pruned. • Planter vegetation may require watering during long dry spells. 	As needed, based on inspection
<ul style="list-style-type: none"> • Fallen leaves and debris from deciduous plants should be removed. 	Three to four times a year
<ul style="list-style-type: none"> • Replenish mulch. • Training/written materials provided to property owners and tenants. 	Annually
<ul style="list-style-type: none"> • Replace planter if cracked or rotted. 	Upon failure

2.2.14.5 Example Schematics

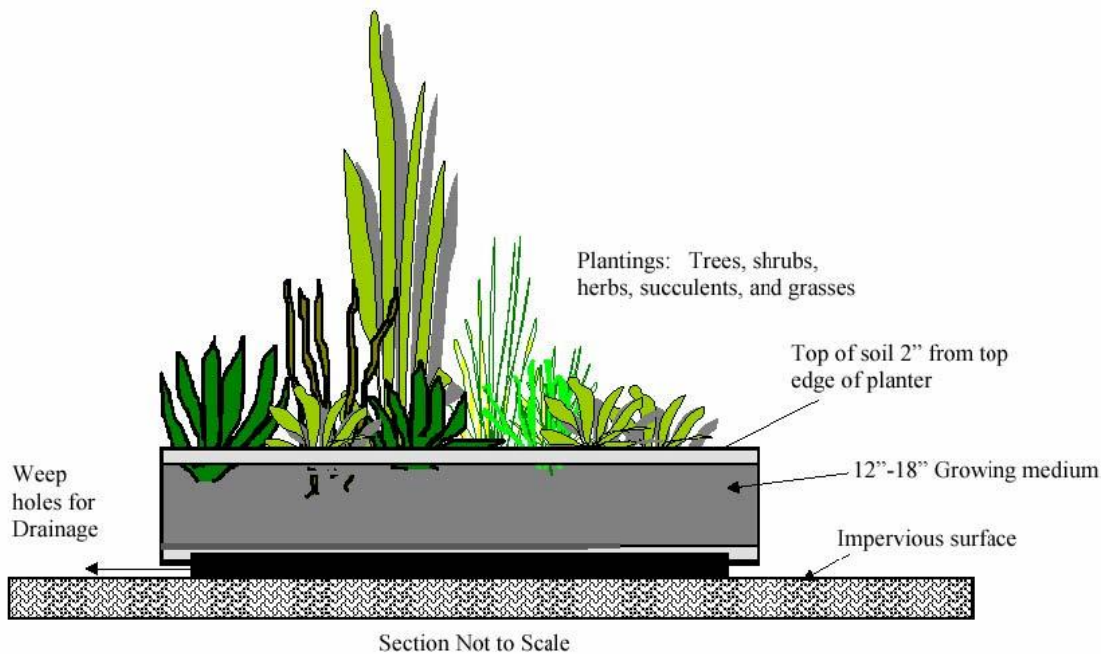


Figure 2.2.14-1 Schematic of Contained Planter Box
 (Source: City of Portland, Oregon)

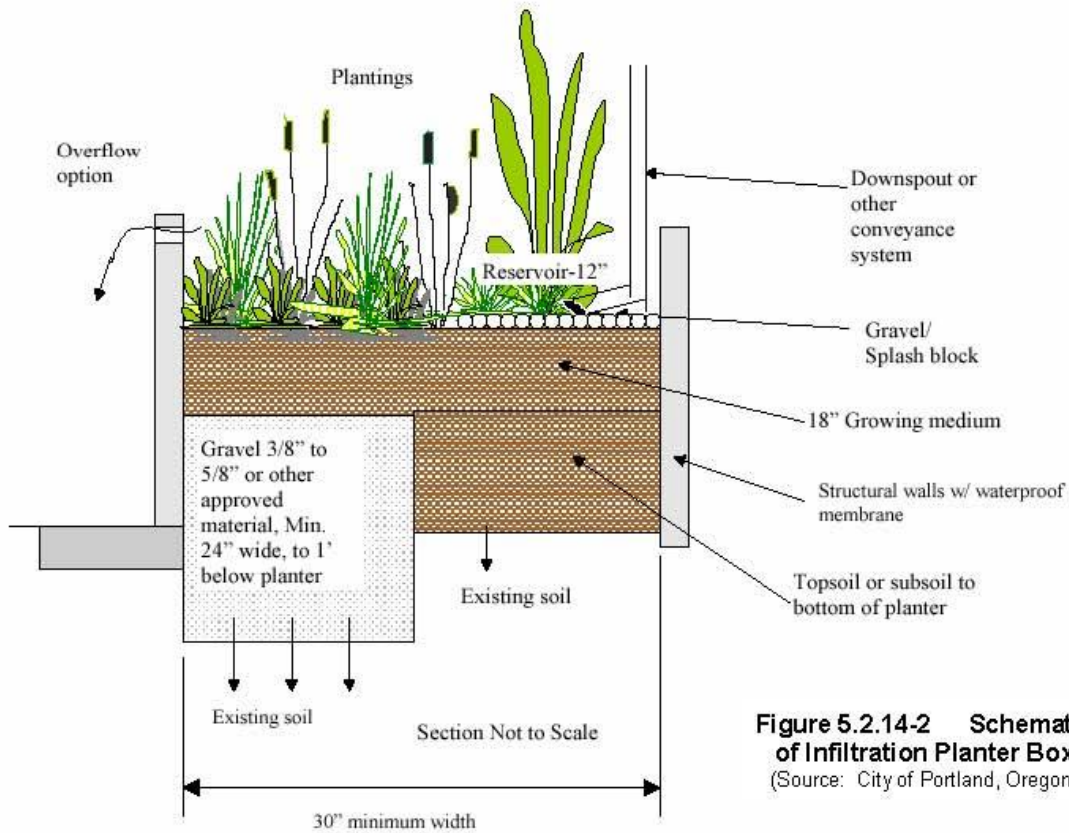


Figure 5.2.14-2 Schematic of Infiltration Planter Box
(Source: City of Portland, Oregon)

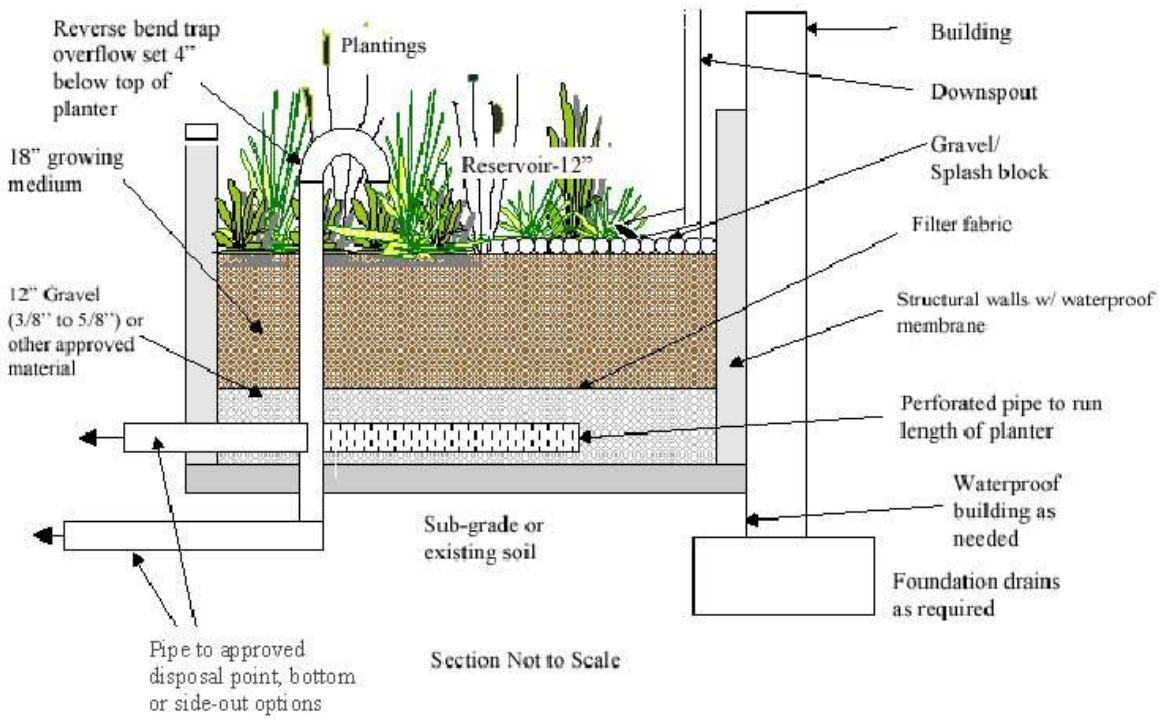


Figure 2.2.14-3 Schematic of Flow-Through Planter Bo
(Source: City of Portland, Oregon)