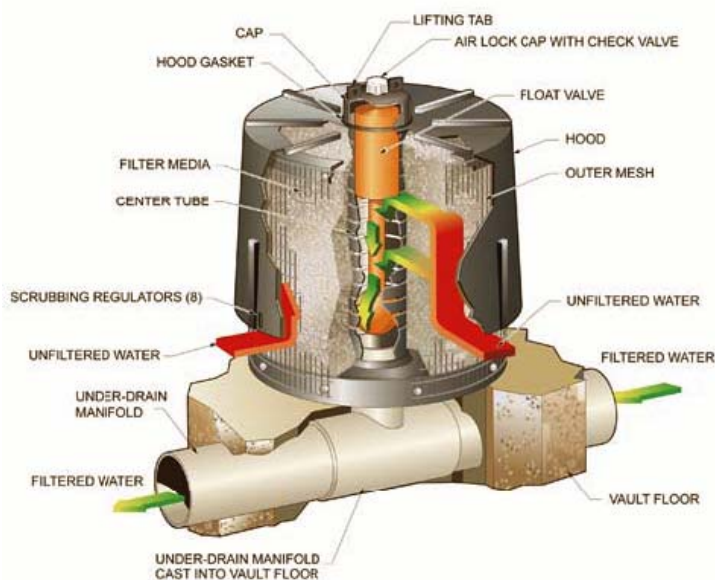


## 6.4 Media Filter



**Figure 6-16. System C Filter Cartridge, Typically Used as Part of Treatment Train.**

Source: CONTECH Stormwater Solutions, 2006. (Note: The proprietary media filters shown are for general information only and are not endorsed by the Countywide Program. An equivalent filter may be used.)

Stormwater media filters are usually two-chambered, including a pretreatment settling basin and a filter bed filled with sand or other absorptive filtering media. As stormwater flows into the first chamber, large particles settle out, and then finer particles and other pollutants are removed as stormwater flows through the filtering media in the second chamber. There are currently three types of manufactured stormwater media filter systems. Two are similar in that they use cartridges of a standard size (filter types B and C, shown in Figure 6-14). The cartridges are placed in vaults; the number of cartridges are a function of the design flow rate. The water flows laterally (horizontally) into the cartridge to a centerwell, then downward to an underdrain system. The third product (type A) is a flatbed filter, similar in appearance to sand filters.

### Design and Sizing Guidelines

There are currently three types of stormwater filter systems:

#### Filter System A:

- This system is similar in appearance to a slow-rate sand filter.
- The media is cellulose material treated to enhance its ability to remove hydrocarbons and other organic compounds. The media depth is 12 inches.
- Operates at a very high rate, at peak flows. Normal operating rates are much lower assuming that the stormwater covers the entire bed at flows less than the peak rate.
- System uses a swirl concentrator for pretreatment.
- As the media is intended to remove sediments (with attached pollutants) and organic compounds, it would not be expected to remove dissolved pollutants such as nutrients and metals unless they are complexed with the organic compounds that are removed.

### Best Uses

- Limited space
- Underground
- Used following a separation unit, such as swirl concentrator

### Advantages

- Less area required
- Customized media
- Customized sizing

### Limitations

- No removal of trash without pre-treatment
- High installation and maintenance costs.

**Filter System B:**

- Uses a simple vertical filter consisting of 3-inch diameter, 30-inch high slotted plastic pipe wrapped with fabric.
- The standard fabric has nominal openings of 10 microns. The stormwater flows into the vertical filter pipes and out through an underdrain system. Several units are placed vertically at 1-foot intervals to give the desired capacity.
- The filter bay has a typical emptying time of 12 to 24 hours.
- In a cartridge filter the media is fabric, therefore the system may not remove dissolved pollutants. It does remove pollutants attached to the sediment that is removed.

**Filter System C:**

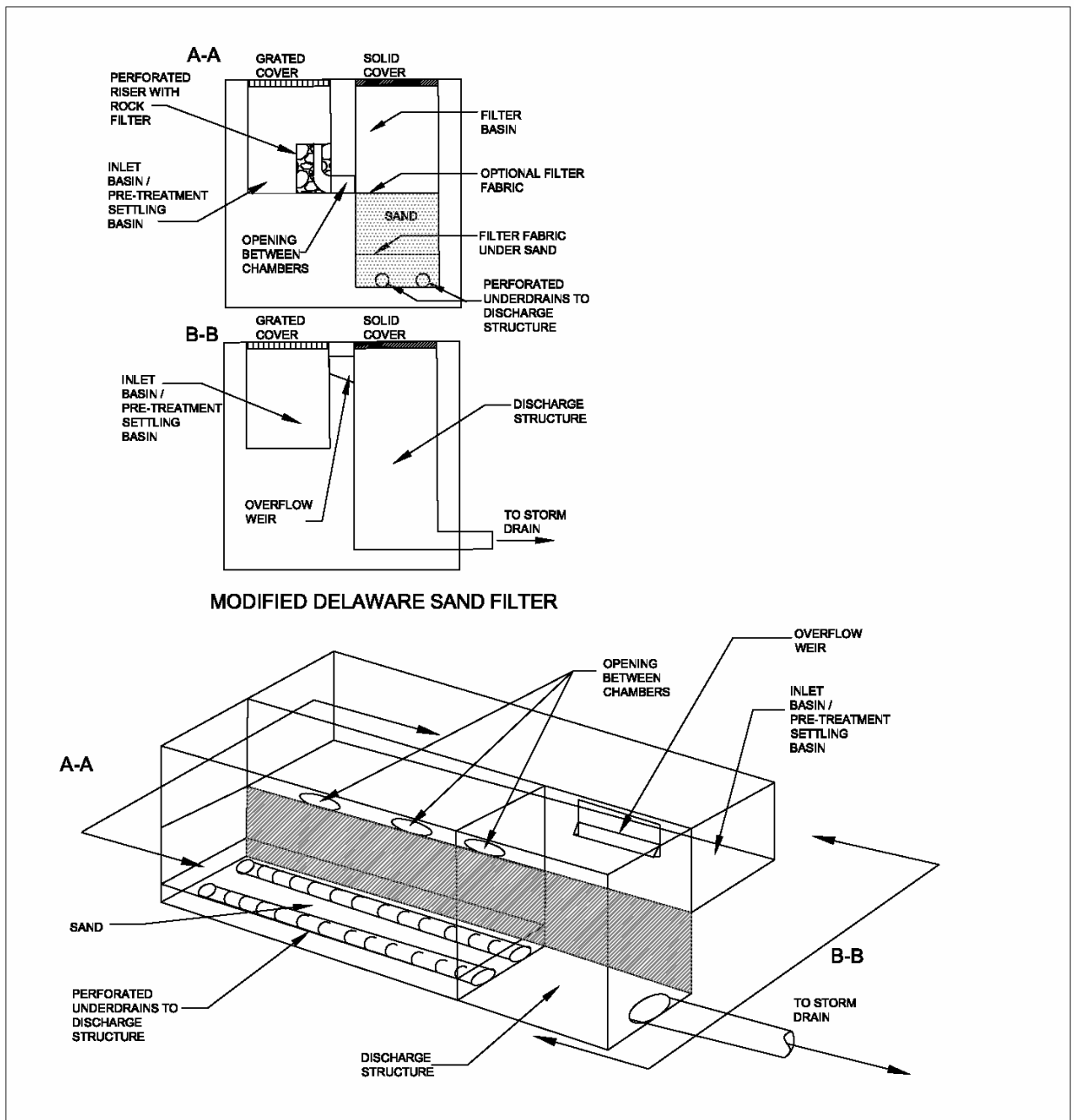
- The system uses vertical cartridges in which stormwater enters radially to a center well within the filter unit, flowing downward to an underdrain system.
- Flow is controlled by a passive float valve system, which prevents water from passing through the cartridge until the water level in the vault rises to the top of the cartridge.
- Full use of the entire filter surface area and the volume of the cartridge is assured by a passive siphon mechanism as the water surface recedes below the top of the cartridge.
- A balance between hydrostatic forces assures a more or less equal flow potential across the vertical face of the filter surface. The filter surface receives suspended solids evenly in this system.
- Absent the float valve and siphon systems, the amount of water treated over time per unit area in a vertical filter is not constant, decreasing with the filter height; furthermore, a filter would clog unevenly.
- Restriction of the flow using orifices ensures consistent hydraulic conductivity of the cartridge as a whole by allowing the orifice, rather than the media, whose hydraulic conductivity decreases over time, to control flow.
- Manufacturers offer several media types used singly or in combination (dual- or multi-media). Total media thickness is about 7 inches. Some media, such as fabric and perlite, remove only suspended solids (with attached pollutants). Media that also remove dissolved pollutants include compost, zeolite, and iron-infused polymer. Pretreatment occurs in an upstream unit and/or the vault within which the cartridges are located. Water quality volume or flow rate (depending on the particular product) is determined by local governments or sized so that 85% of the annual runoff volume is treated.

All 3 types of media filter shall have a pretreatment system in place such as a swirl concentrator.

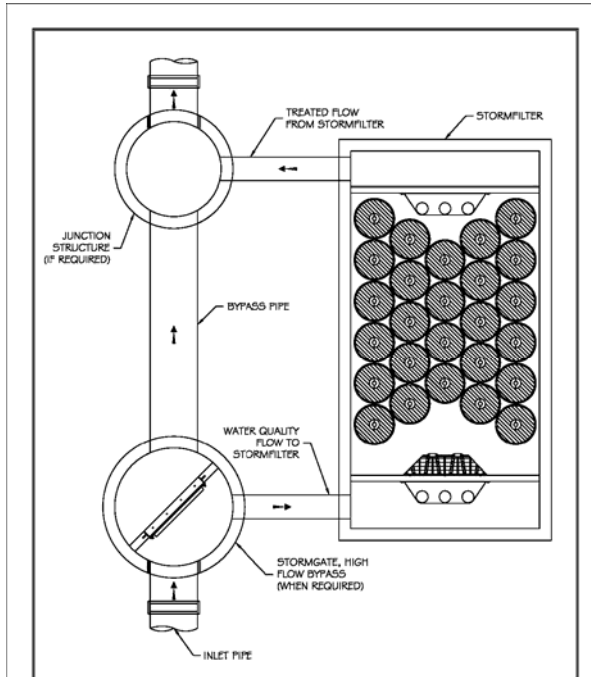
***MAINTENANCE***

- A maintenance agreement shall be provided.
- The maintenance agreement shall state the parties' responsibility for maintenance and upkeep.
- Maintenance activities and frequencies are specific to each product. Annual maintenance is typical.
- Manufactured filters, like cartridge filters, require more frequent maintenance than most standard treatment systems, typically annually for most sites.

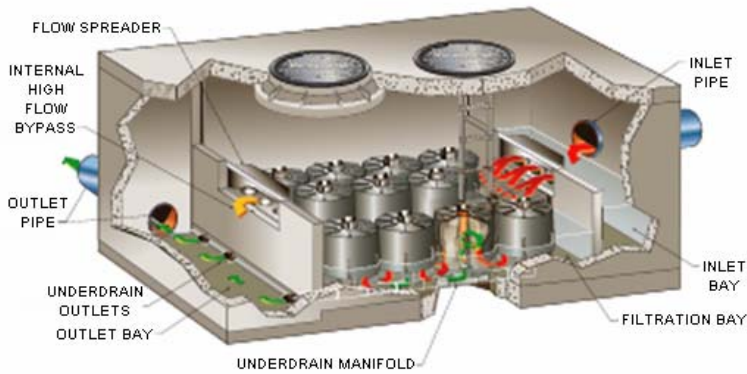
Figure 6-17. Cut Away Profile Views, System A Filter



# Modified Delaware Media Filter



**Figure 6-18. Profile View, Typical System C Filter Array.** Source: CONTECH Stormwater Solutions, 2006. (Note: The proprietary media filters shown are for general information only and are not endorsed by Countywide Program.)



**Figure 6-19. Plan View, Typical System C Filter Array.** Source: CONTECH Stormwater Solutions, 2006. (Note: The proprietary media filters shown are for general information only and are not endorsed by Countywide Program.)