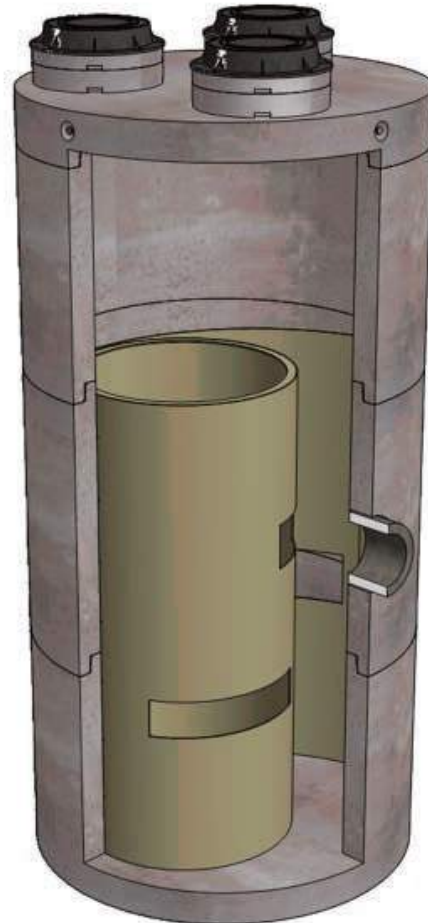
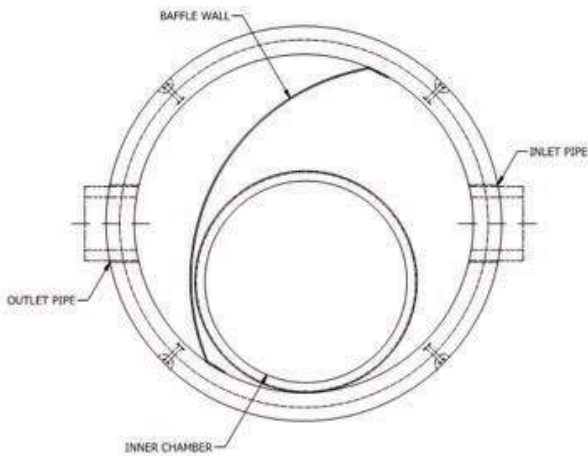




## ***Hydroguard***

Stormwater Hydrodynamic Separator



### **Hydroguard offers an ideal solution for urban runoff stormwater pollution**

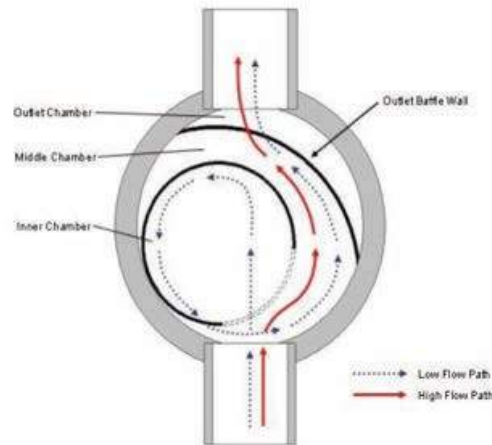
The Hydroguard stormwater treatment structure efficiently removes the suspended solids (and associated metals, nutrients and bacteria), oil, and trash from stormwater runoff fulfilling the requirements of most NPDES permits and Clean Water Act requirements.

Its the only stormwater treatment structure on the market that addresses the need to treat flows differently from high flows since the types of pollutants vary with flow rate.

Hydroguard's unique design treats both low and high flows, and contains them in separated treatment areas. The dual treatment area configuration allows Hydroguard to minimize scour and re-suspension of previously captured fines in the low flow treatment area during high flow conditions.

# HYDROWORKS HG OPERATION

The Hydroworks HG separator is unique since it treats both high and low flows in one device, but maintains separate flow paths for low and high flows. Accordingly, high flows do not scour out the fines that are settled in the low flow path since they are treated in a separate area of the device as shown in Figure 1.



## The HG separator consists of three chambers:

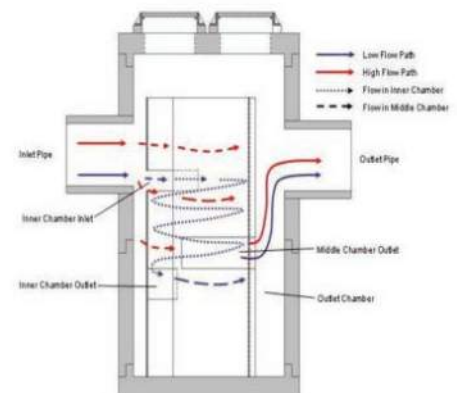
1. An inner chamber that treats low or normal flows
2. A middle chamber that treats high flows
3. An outlet chamber where water is discharged to the downstream storm system

Under normal or low flows, water enters the middle chamber and is conveyed into the inner chamber by momentum. Since the inner chamber is offset to one side of the structure the water strikes the wall of the inner chamber at a tangent creating a vortex within the inner chamber. The vortex motion forces solids and floatables to the middle of the inner chamber. The water spirals down the inner chamber to the outlet of the inner chamber which is located below the inlet of the inner chamber and adjacent to the wall of the structure but above the floor of the structure. Floatables are trapped since the outlet of the inner chamber is submerged. The design maximizes the retention of settle able solids since solids are forced to the center of the inner chamber by the vortex motion of water while the outlet of the inner chamber draws water from the wall of the inner chamber.

The water leaving the inner chamber continues into the middle chamber, again at a tangent to the wall of the structure. The water is then conveyed through an outlet baffle wall (high and low baffle). This enhances the collection of any floatables or suspended solids not removed by the inner chamber. Water flowing through the baffles then enters the outlet chamber and is discharged into the downstream storm drain.

During high flows, the flow rate entering the inner chamber is restricted by the size of the inlet opening to the inner chamber. This restriction of flow rate into the inner chamber prevents scour and re-suspension of solids from the inner chamber during periods of high flow. The excess flow is conveyed directly into the middle chamber where it receives treatment for floatables and suspended solids via the baffle system.

This treatment of the higher flow rates is important since trash and heavier solids are typically conveyed during periods of higher flow rates. The Hydroworks HG separator is revolutionary since it incorporates low and high flow treatment in one device while maintaining separate low and high flow paths to prevent the scour and re-suspension of fines.





## Materials

The inner chamber and outlet baffle are made out of a copolymer polypropylene. The shell of the structure is precast concrete. These materials allow for advantages which includes long service life, ease of installation, anti-bouyancy, traffic loading and low maintenance requirements.

## Precon will:

- Install all internal baffles as required
- Provide sizing calculations including Particle Size Distribution, Operations and Maintenance Manual and Approval Drawings.

## Independent Laboratory testing includes

- Alden Laboratory (MA) 2008
- TSS Removal (mass) at different rates
- Hydraulic Testing
- Scour Testing
- TSS used was NJDEP Mixture (20%<8 $\mu$ m)

## Precon offers Hydroworks HG Separator Dimensions

MODEL	Structure Inside Diameter (SID) in (mm)	Structure Depth ft(mm)	Sediment Volume ft <sup>3</sup> (m <sup>3</sup> )	Oil/Floating Trash Volume US gal (L)	Permanent Pool Wet Volume US gal (L)
HG 4	4 (1200mm)	5 (1500mm)	38 (1.1)	76 (288)	470 (1779)
HG5	5 (1500mm)	5.5 (1650mm)	64 (1.8)	123 (465)	808 (3059)
HG6	6 (1800mm)	6 (1800mm)	92 (2.6)	203 (768)	1269 (4803)
HG8	8 (2400mm)	7 (2000mm)	163 (4.6)	457 (1730)	2507 (9490)
HG 10	10 (3000mm)	7.6 (2300mm)	268 (7.6)	893 (3380)	4455 (16864)

## **BENEFITS**

- lower capital cost compared to other competitive structural stormwater quality measures
- treats low and high flows
- separate low flow path
- minimizes scour at high flows
- removes trash
- captures oil spills
- removes fine suspended solids
- supports Smart Growth principles since Hydroguard is installed underground maximizing the development density potential
- engineered for traffic loading and anti-bouyancy
- minimum elevation difference between inlet and out pipe
- can be used as a bend structure
- sized based on local hydrology and continuous simulation
- technical support to assist with design and approval
- minimal maintenance for typical applications
- multiple access points for inspection and maintenance.

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