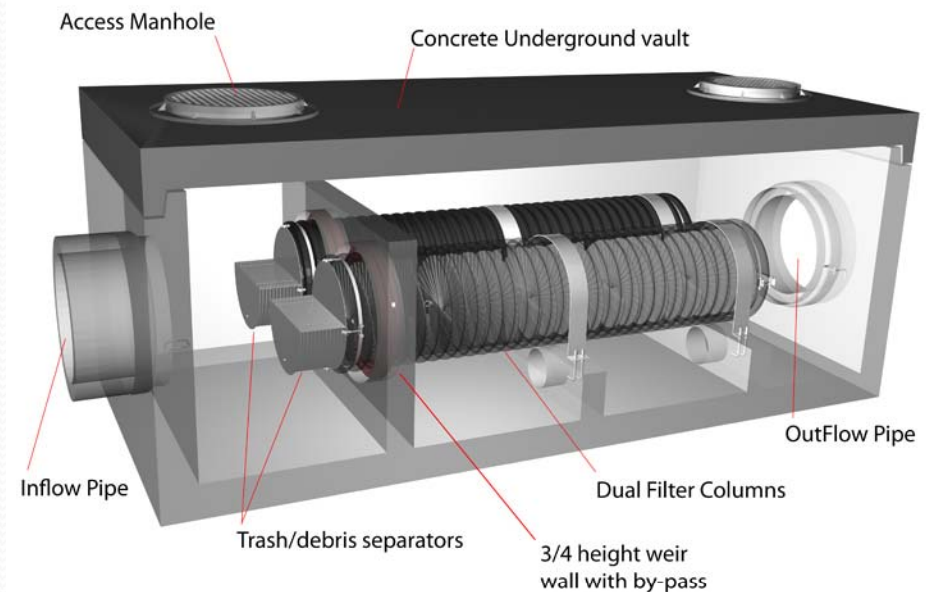


Helix Stormwater filter



- Treats pathogens/bacteria: E coli, Fecal Coliform, Enterococcus, others
- Dual helix filter provides high flow rate and effectiveness with minimal clogging
- Various model configurations available with treatment based on helical frame size - treating 2.8 to 850 lps (0.1 to 30 CFS)



Helix specifications



Helix Filter Diameter	Unit Flow per Tube (Q) – cfs	Unit Flow per Tube (Q) – lps
15" (380 mm)	0.33	9
18" (450 mm)	1.0	28
24" (600 mm)	2.3	65
30" (750 mm)	3.0	85

Based on unit flow rates, scaling would consist of parallel tubes have a treatment capacity of Number Tubes X Unit Flow Rate

- 1 X HF-18 Treats 1 cfs
- 2 X HF-18 Treats 2 cfs
- 3 X HF-18 Treats 3 cfs

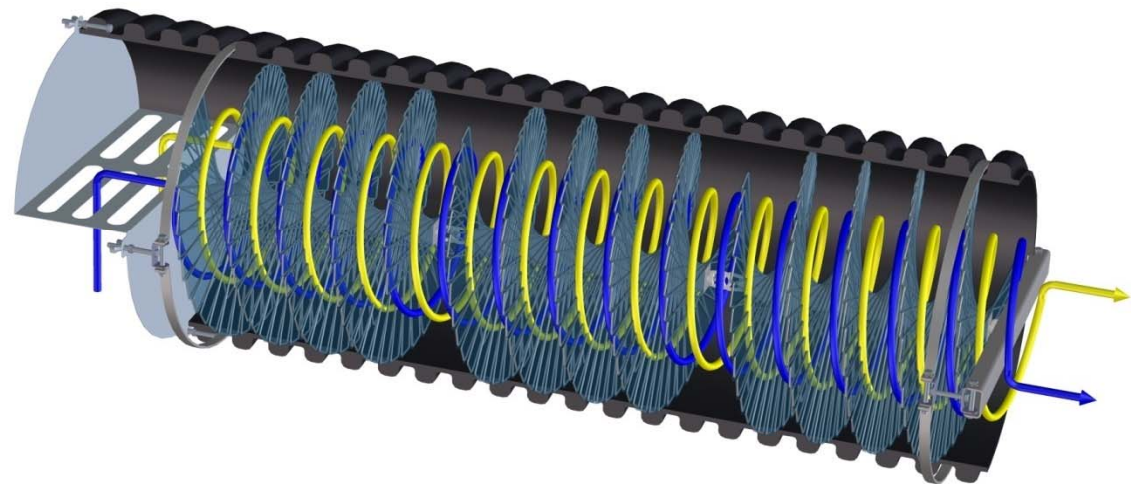
The treatment process



At low volume flow rates water moves through the helix column as if it were a series of permeable disks or flutes

When flow rates increase or the filter begins to age, water is able to flow around some of the initial disks by following the open path provided by the fluted helix shape.

This action maximizes filter effectiveness and extends its life



Yellow and Blue lines represent the open pathways through the dual helix shape. This design reduces blinding and increases treatment surface area. The swirling motion also provides a self cleaning action.

FabGuard Media



The Helix uses a helical shaped filter element covered with an open cell foam filter media called FabGuard to treat the incoming stormwater runoff

FABGUARD Antimicrobial Shield is a patented chemical technology that when applied to our foam material makes it antimicrobially active.

The FABGUARD Antimicrobial Shield becomes an integral part of the material and will not wash out, or leach into the environment. Microorganisms that subsequently contact the material are neutralized.

FabGuard has been extensively tested under laboratory and field conditions.



Results from a Fabco beach study project demonstrated average E.Coli and Fecal coliform reductions of 70%

How Does It Work?



When applied as a liquid to the host foam material the active ingredient in the FabGuard Antimicrobial Shield forms a colorless, odorless, positively charge polymer coating which chemically bonds, virtually irremovable, to the treated foam surface. You could think of it as a layer of electrically charge swords or super stiff fibers.

<http://www.youtube.com/watch?v=ccYaXIoYuVo>

When a microorganism comes in contact with the treated surface, the fibers puncture the cell membrane and the electrical charge shocks the cell. Since nothing was transferred to the now dead cell, the FABGUARD Antimicrobial Shield doesn't lose strength and the sword is ready for the next cell to contact it.

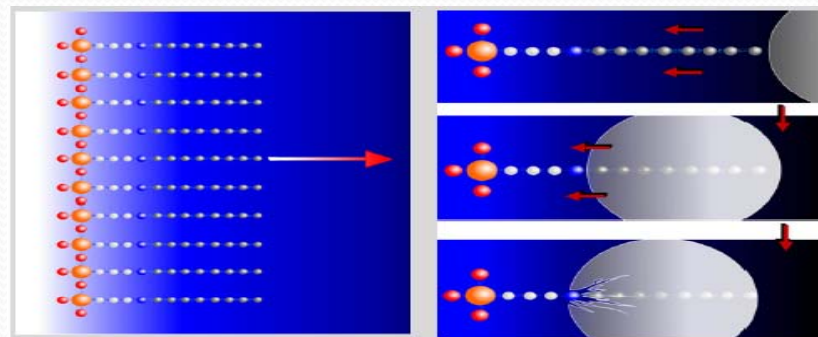


Fig 1: Super stiff fibers

Fig 2: Close-up - Individual fiber puncturing Cell membrane

Building the filter column



The completed helical filter elements are inserted into a smooth wall plastic pipe. Five 750 mm (30") long elements are needed per filter column.

A metal trash separator is added to the front of each filter column to keep large debris out of the filter during operation.



Helix Filter Element



Fig 1: Contaminated Water flows through and around the FabGuard filter media where bacteria is killed on contact

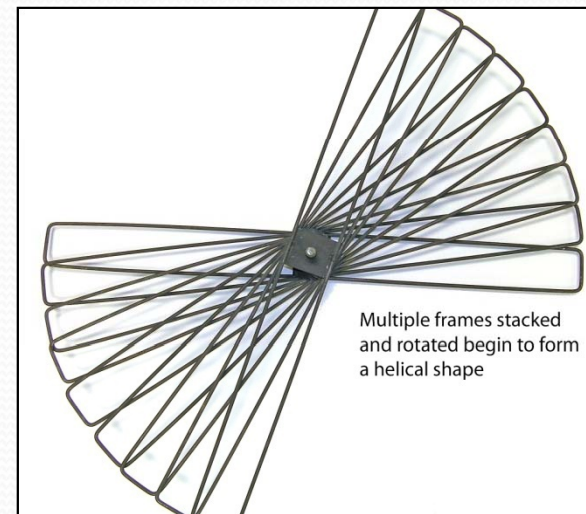
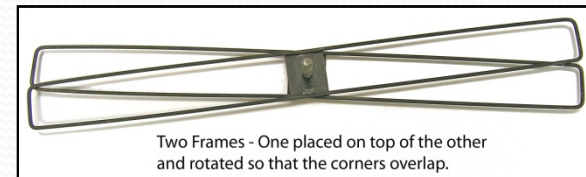
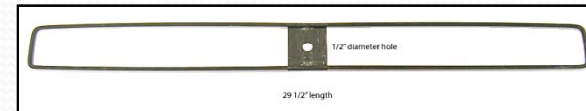
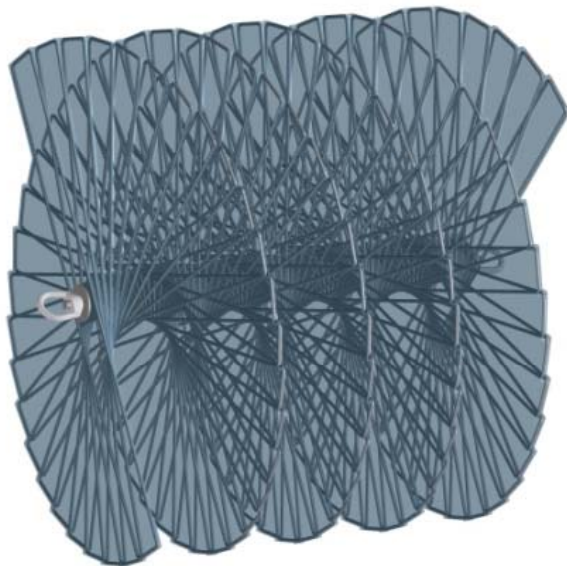
Fig 2: The helical shape provides 2 spiral open paths through the filter.



Helix Frame Fabrication



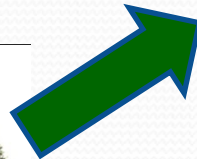
The Helix filter element is constructed of individual steel frames assembled on a central rod to form the dual helix shape.



Helix Media Fabrication



Before the frames are assembled on the rod each one is covered with FabGuard treated foam filter media.



Helix Filter Element



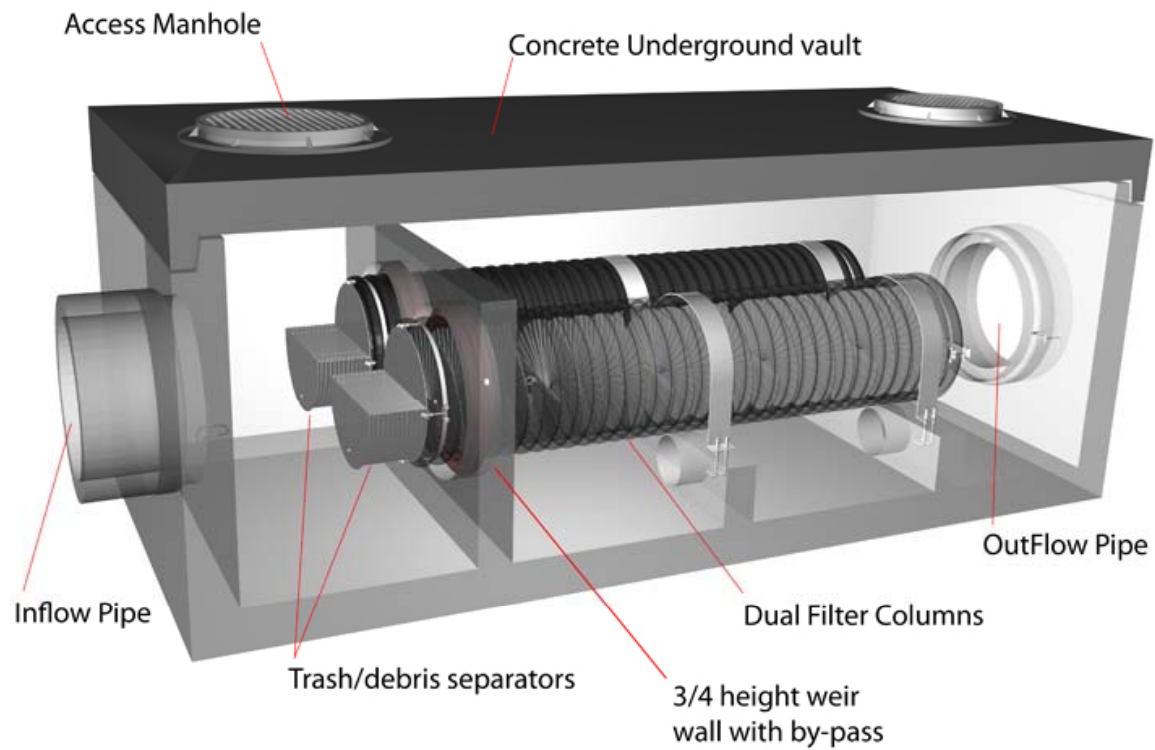
Fig 1: Contaminated Water flows through and around the FabGuard filter media where bacteria is killed on contact



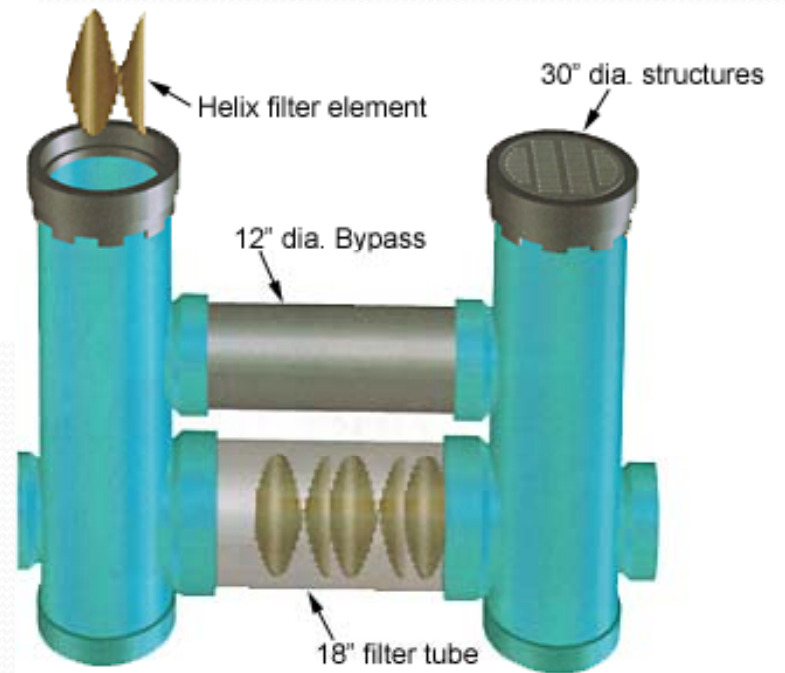
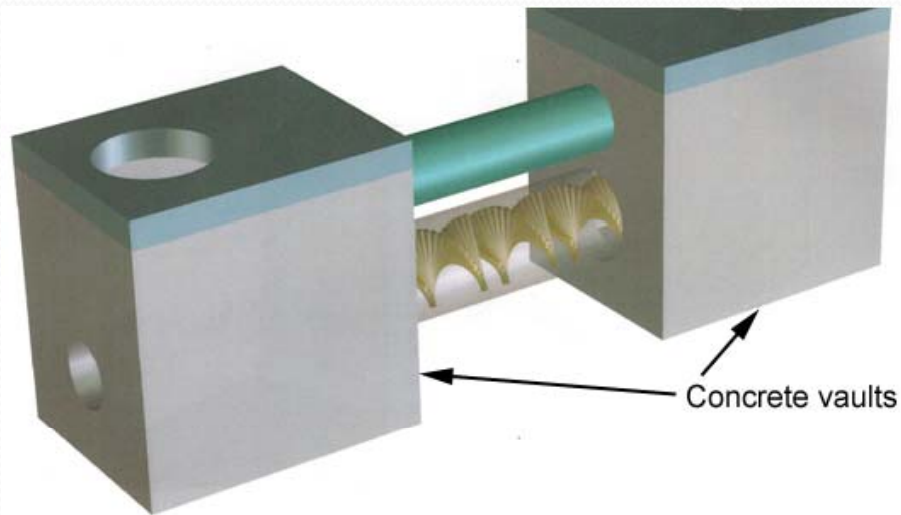
Fig 2: The helical shape provides 2 spiral open paths through the filter.



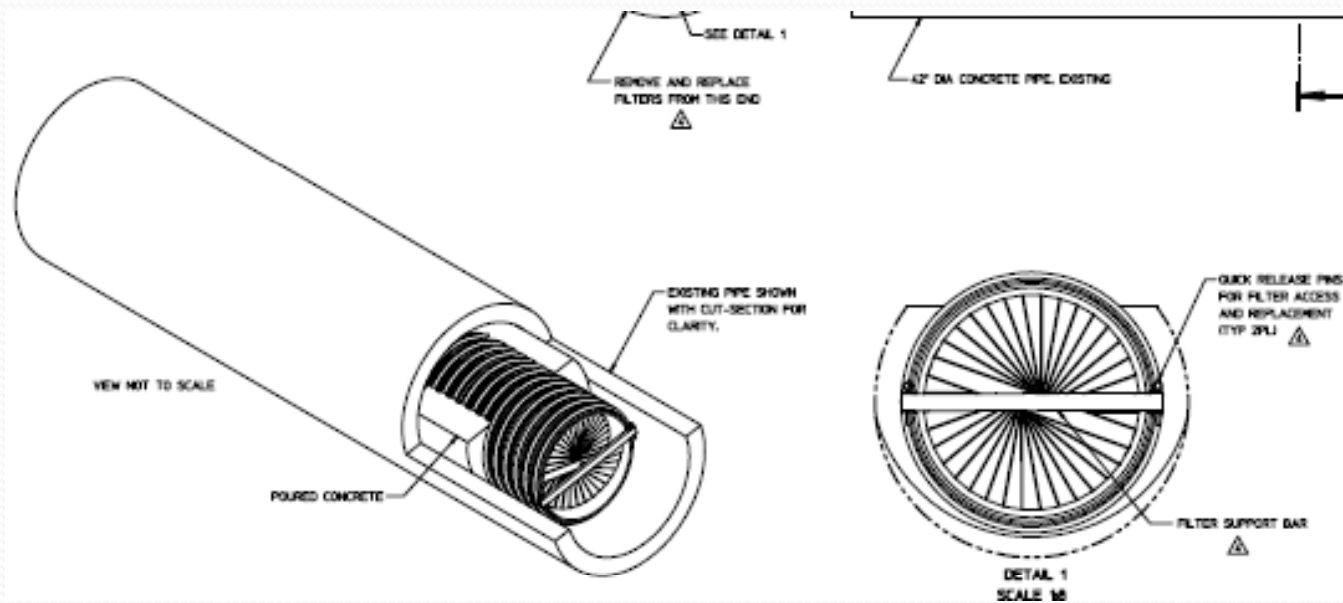
Helix Configurations



Alternative Helix Configurations



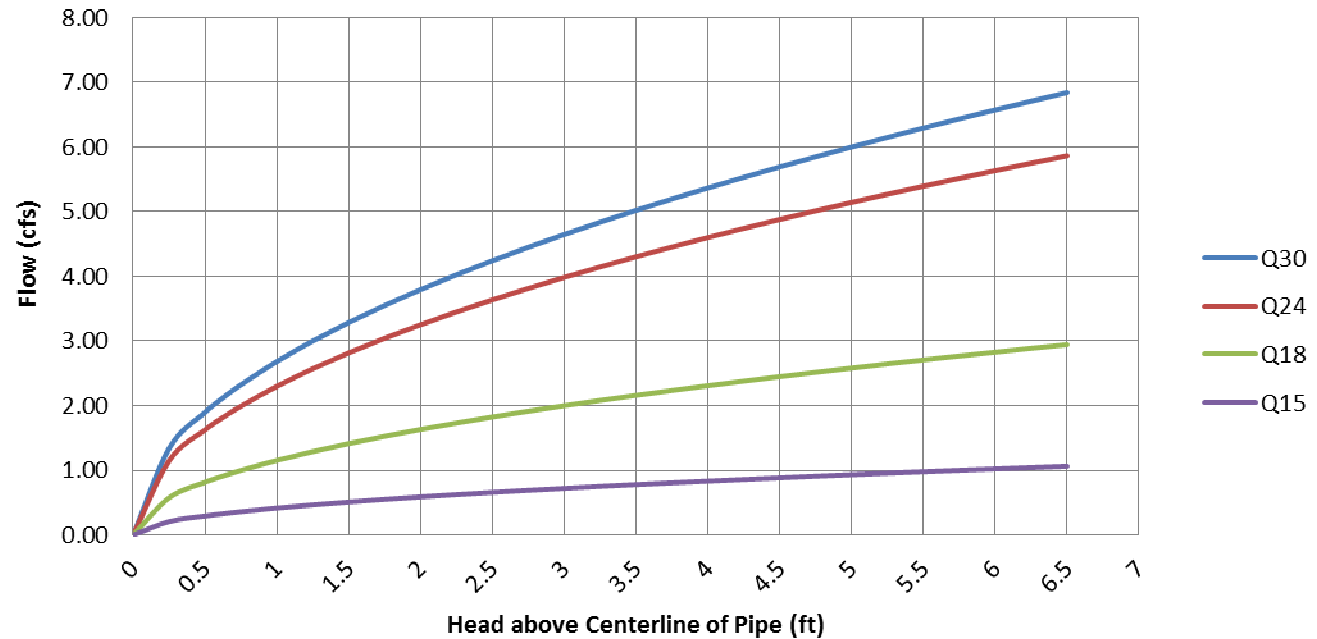
Helix Configurations



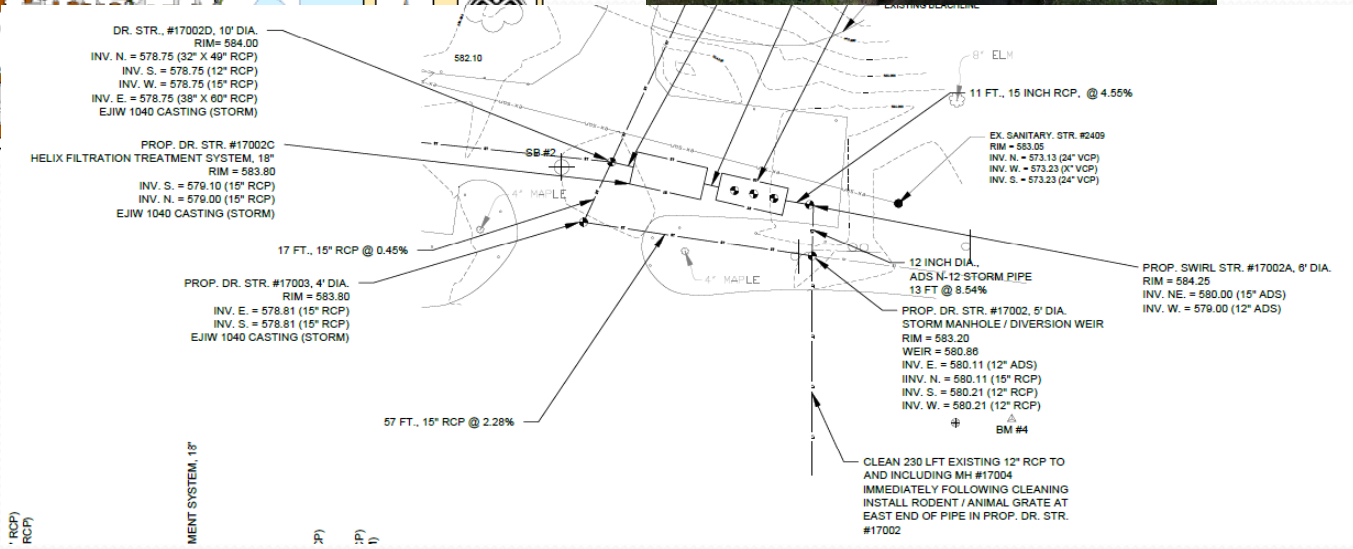
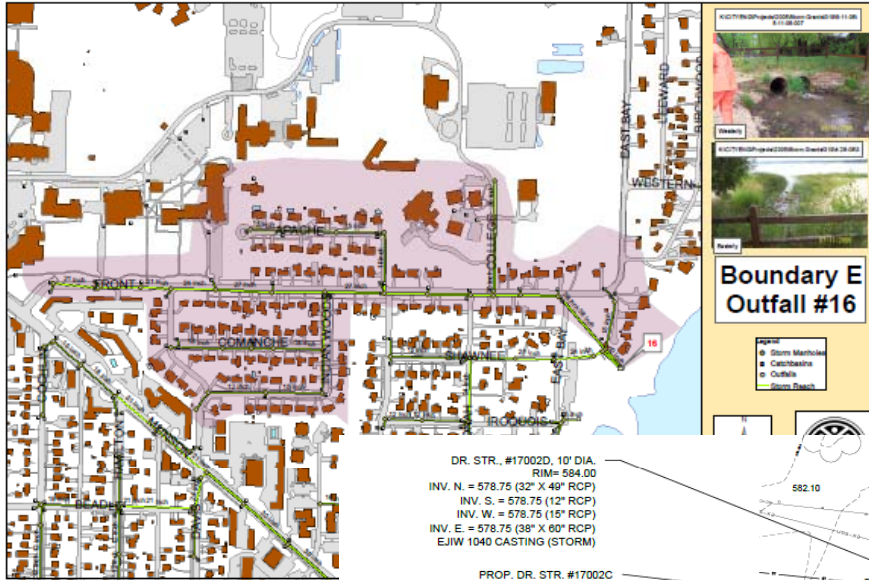
Hydraulic Efficiency



StormSafe Helix Stage Discharge Curves
(Assumes fully developed orifice flow)



Case Study – Traverse City, MI



Case Study – Traverse City, MI



Case Study – Wantagh, NY



Case Study – Port Orange, FL



Case Study – Brooklyn, NY



Single helix filter with FabSorb oil sorbent material inserted into existing outfall pipe draining directly into waterway.

Effluent requirement was no visible sheen and < 10 ppm TPH

Result – Helix filter is keeping the site in compliance with their permitted outfall requirements. Maintenance of helix filters 4X per year.

