



# Next Generation Innovative GI Technologies

*High Performance Modular Biofiltration Systems:  
A 2<sup>nd</sup> Generation Solution to Stormwater Management*

**LET'S GET IT DONE**

# Queenston Manor Apartments – Academy Development Corp.

## WHY LOW IMPACT DEVELOPMENT?

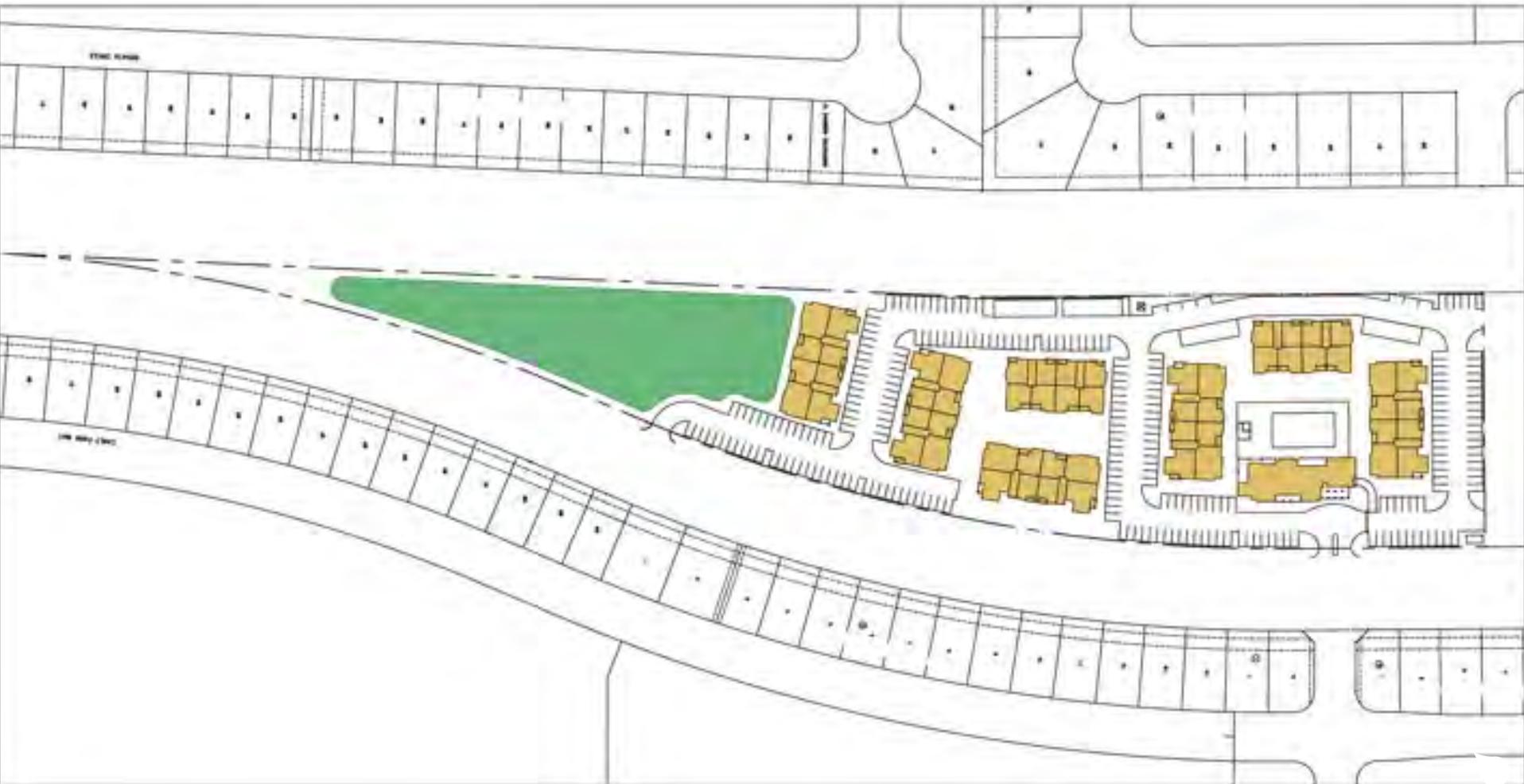
- Economics
- Aesthetics
- Maintenance

6700-Queenston Blvd



# Queenston Manor Apartments – Economics

## Conventional Design



# Queenston Manor Apartments – Economics Low Impact Development/GI Design



# Queenston Manor Apartments - Economics

## Design

- 7 Acres @ .35 ACFT/AC = 106,000 CF

## Integrated Design Approach

- 43,560 SF Porous Pavers @ \$12 SF = \$522,720 (-\$217,800) = \$304,920
- 21,000CF UG Detention / Drainage @ \$6 = \$126,000 (-\$50,000) = \$76,000
- 600 SF Biofiltration System @ \$100 SF = \$60,000
- 50,000 CF @ \$.50 CF (Bioswale Excavation & Haul off) = \$25,000
- 2,500 SY Sod @ \$1.30SY = \$3,250

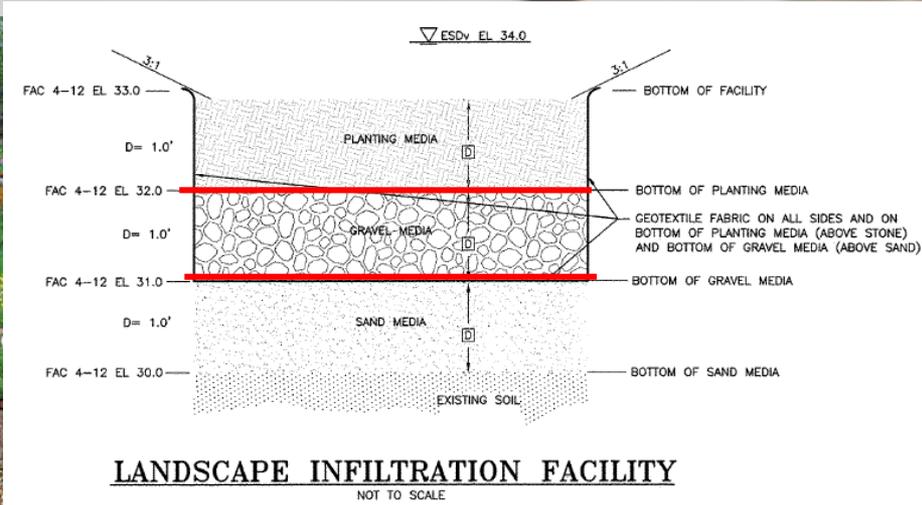
Total Hard Cost = \$469,170

**Opportunity Seized – ROI = 10 Months**

# Queenston Manor Apartments - Economics



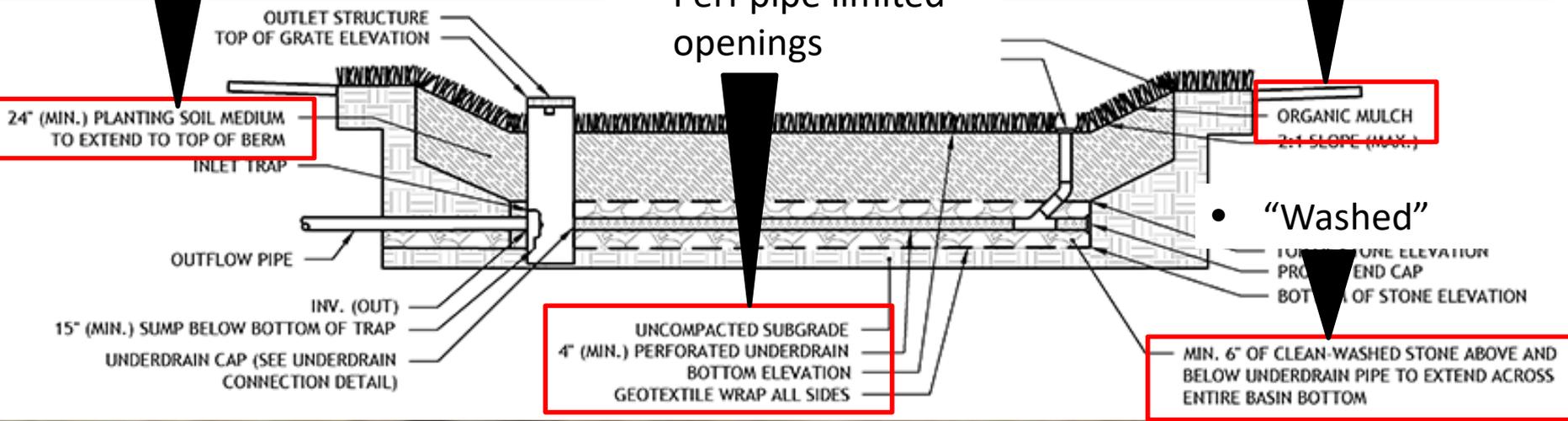
# FIRST GENERATION DESIGN – TRADITIONAL BIORETENTION



- Poor QC
- Mixed in Field
- Unreliable WQ

- Poor spec
- Too many fines
- softwood

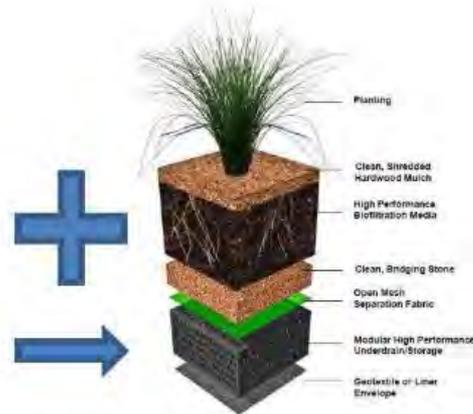
- Generic fabric..
- Perf pipe limited openings



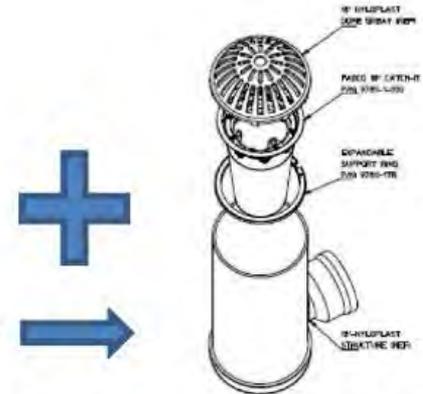
# Treatment Trains



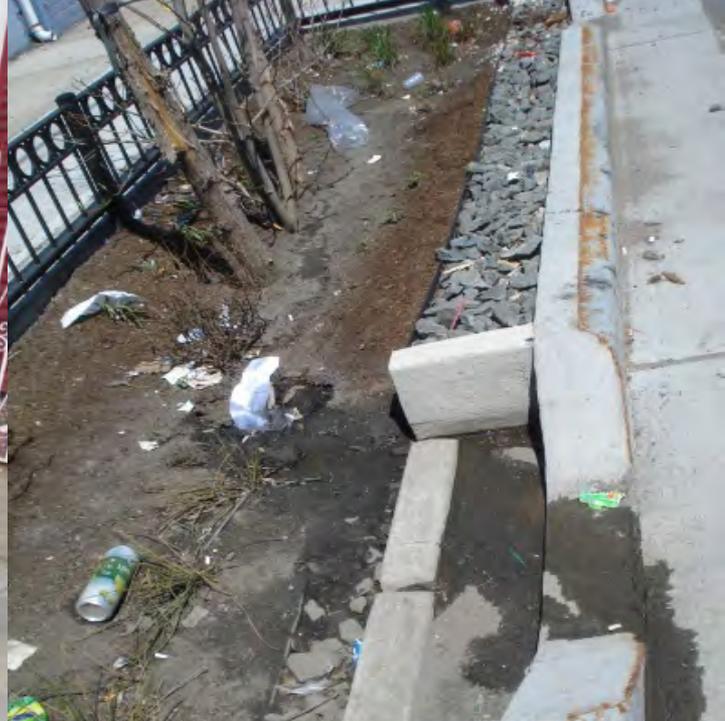
**PRETREATMENT:**  
**RAIN GUARDIAN**  
**TURRET**



**PRIMARY TREATMENT:**  
**FOCALPOINT**



**OVERFLOW BYPASS:**  
**BEEHIVE OVERFLOW**  
**FILTER**





# Maximize Capacity & Extend Effective Bioretention Cell Life

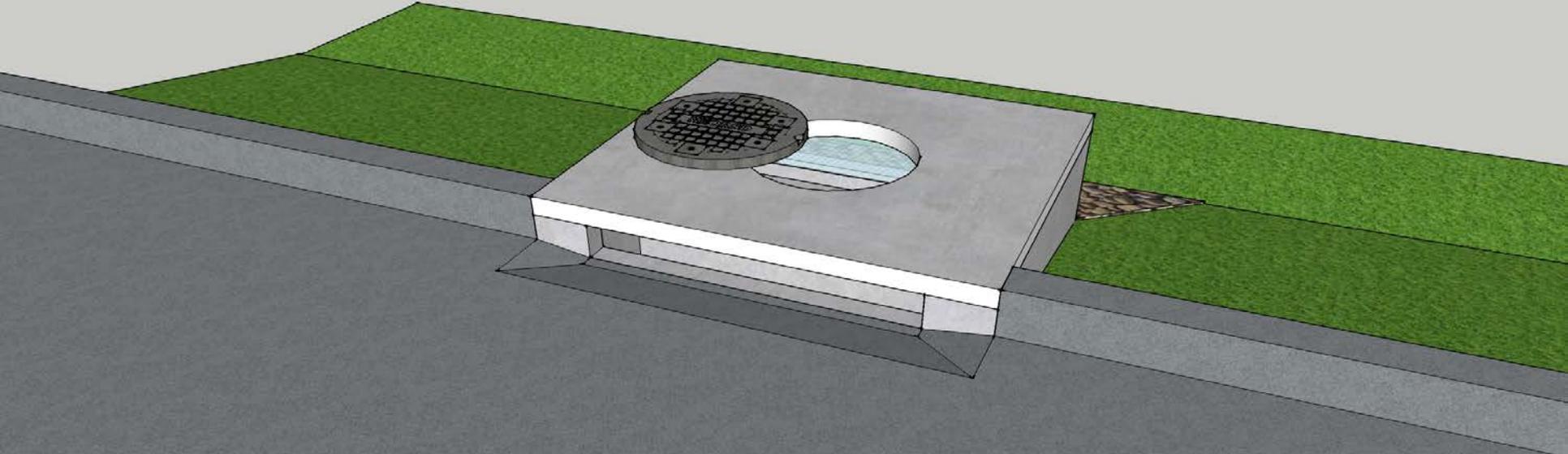


Collection of solids and energy  
dissipation

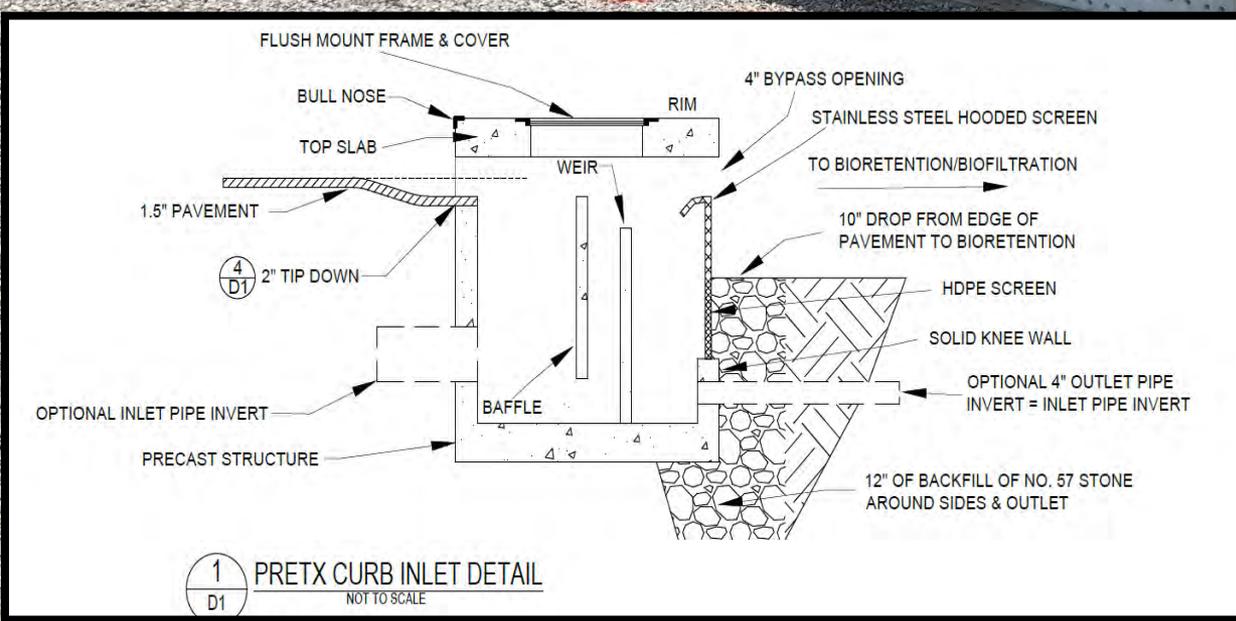
Rain Guardian: Provides stable inlet & pretreatment,  
drains and dries between storm events.



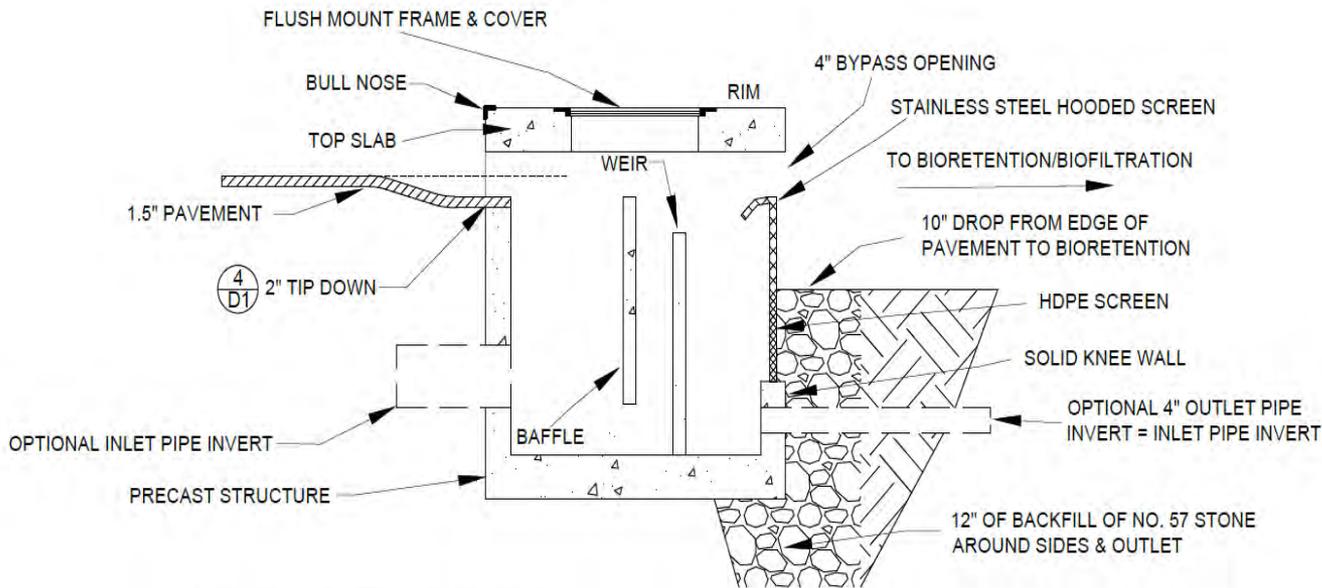
# PRETX – BIOFILTER INLET



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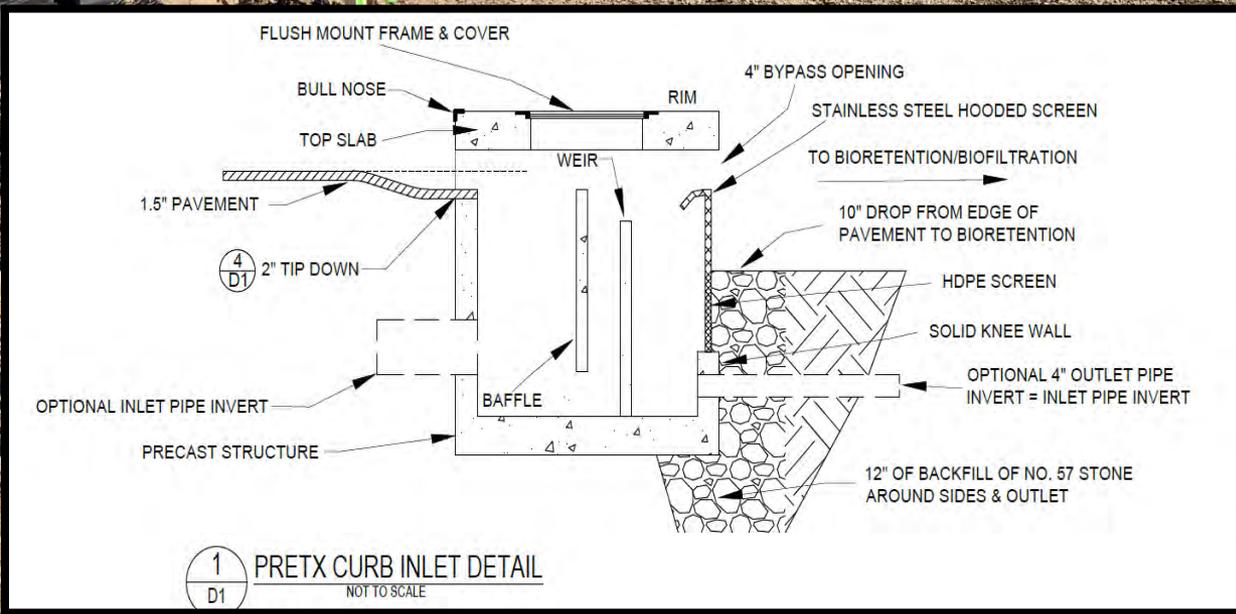


# PRETX – BIOFILTER INLET

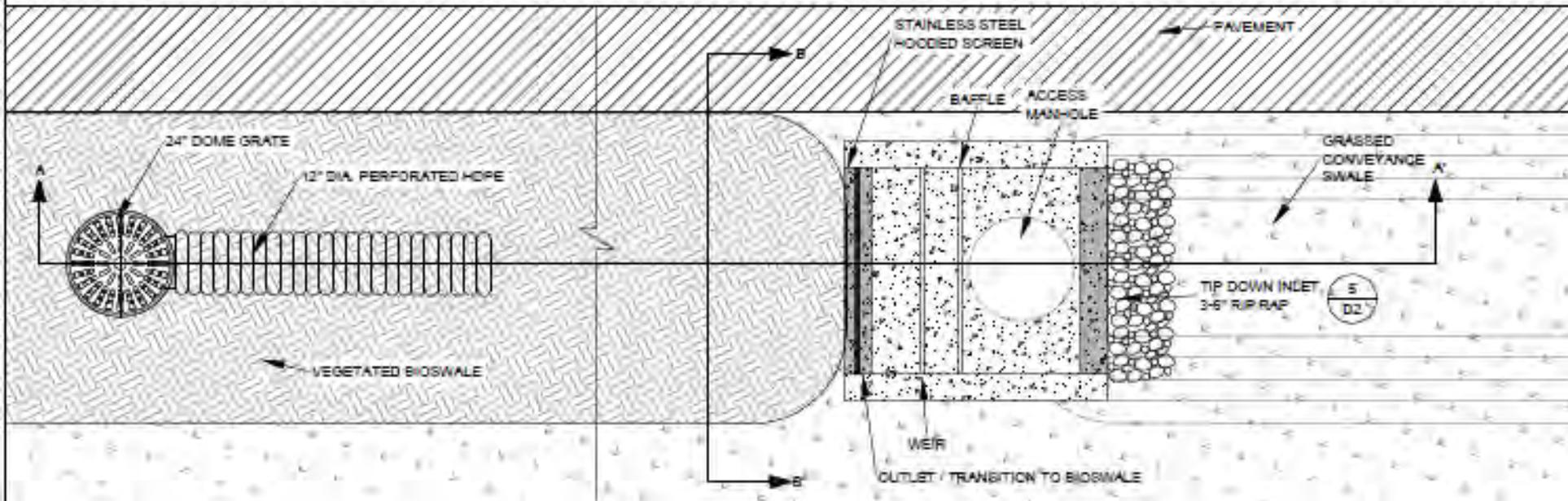
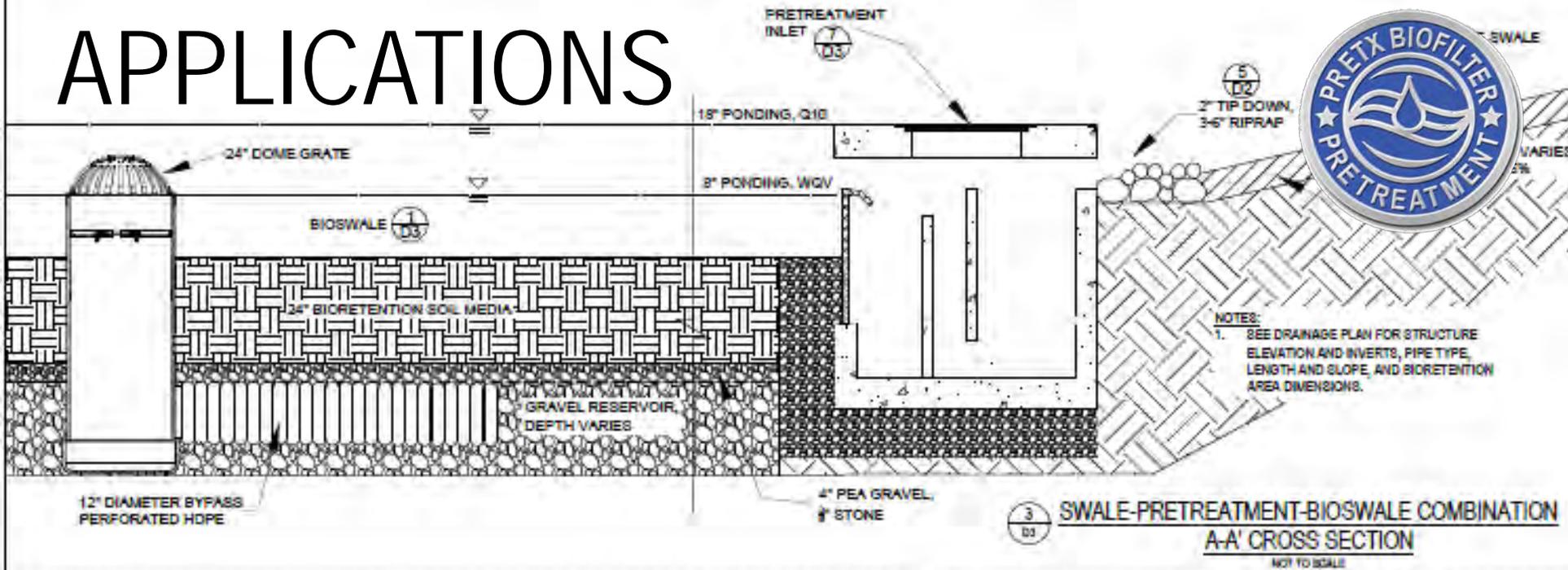


1 PRETX CURB INLET DETAIL  
D1 NOT TO SCALE

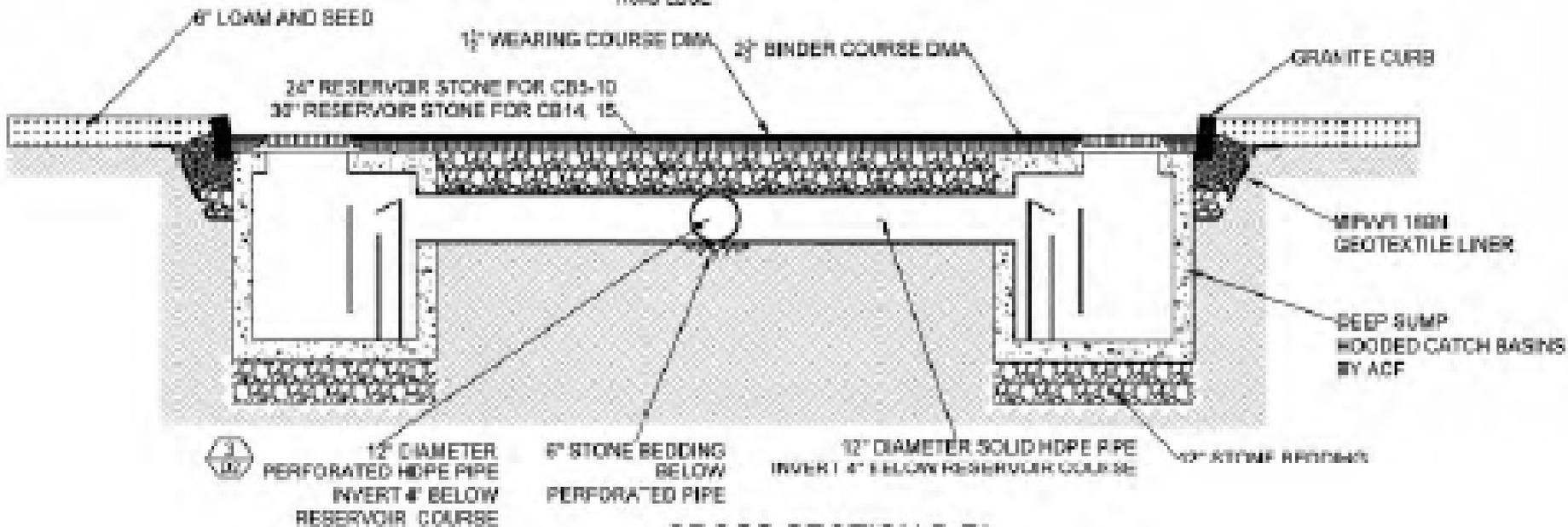
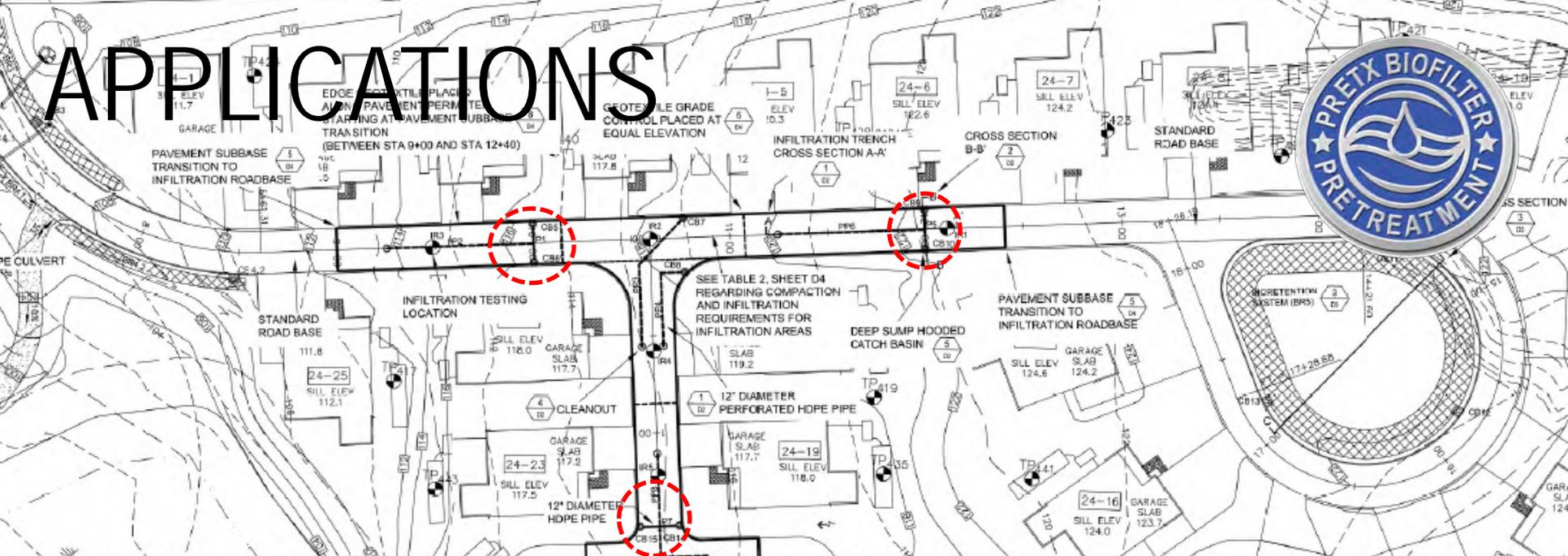
# PRETX – BIOFILTER INLET



# APPLICATIONS



# APPLICATIONS



CROSS SECTION B-B'

# FOCALPOINT BIOFILTRATION SYSTEM PROFILE

## Vegetated System:

Plants process pollutants removed from run-off and root system maintains drainage and aeration of media.

## 3" Layer of Shredded Hardwood Mulch:

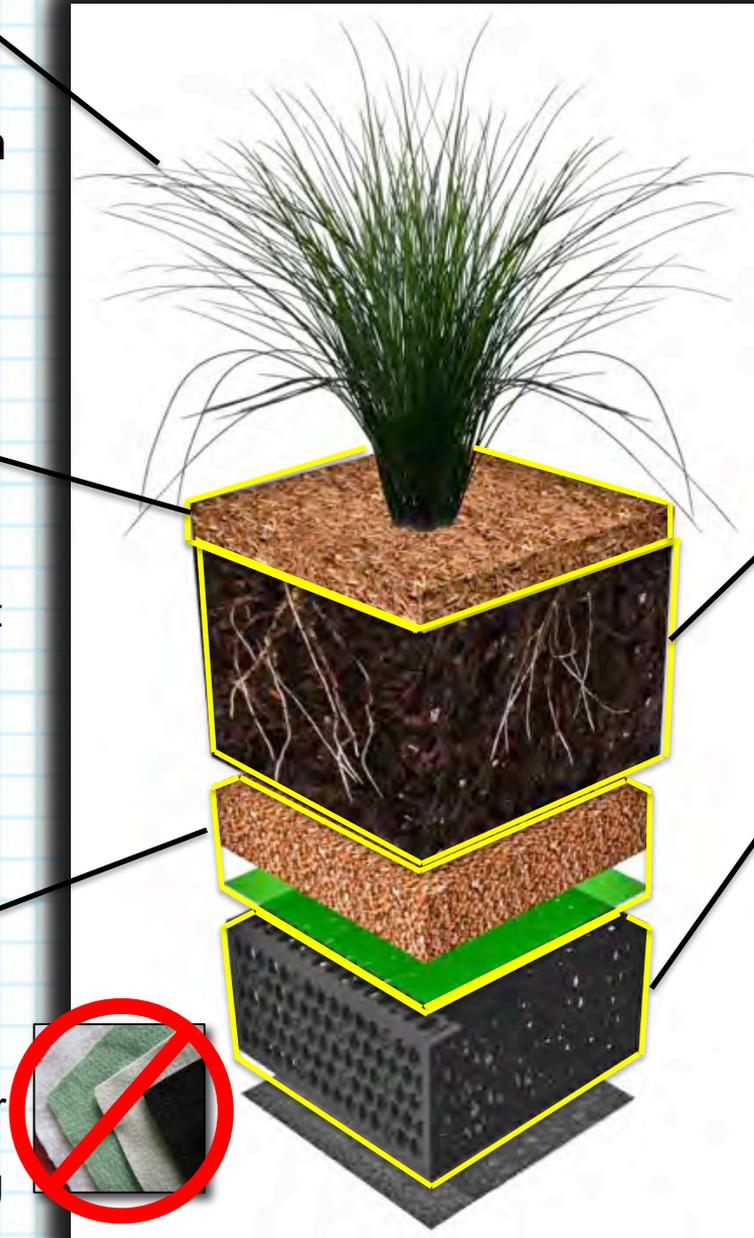
Pre-treatment mechanism.

Removal and Replacement of Mulch Represents the Bulk of System Maintenance!

## 6" Bridging Stone & Separation Layer:

Clog-Proof Clean Stone & Micro-Mesh Replace Traditional Geotextile Layer

No geotextile = no clogging



## 18" High Performance Media:

Flows at 100" Per Hour / 200 ft per day  
Resistant to Clogging

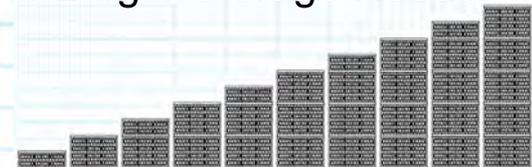
3<sup>rd</sup> Party Field and Lab Test – for TSS, P and N – PWD APPROVED MEDIA FILTER

## High Performance Underdrain:

9.45" Modular Tank, or "Flat Pipe" w/95% Open Surface  
Collects Water Efficiently.

Optional 2" Low-Profile Panel Addresses Shallow Applications.

Expand into Modular Tanks for Larger Storage Needs.



# BRIDGING



**QA/QC:** All components bundled for quality control



# FocalPoint components delivered in easy to handle super sacks:

**Plants:** Provide pollutant uptake and media sustainability.



**Mulch:** Pre-treatment mechanism and primary maintenance component.



**6" Separation Layer**



**No Geotextile = No Clogging**

**High Performance Media:** High Flow Rate (100 in-hr/200 ft day) and Pollutant Removal Efficiency



TSS = 91%  
Nitrogen = 48%  
Phosphorous = 66%

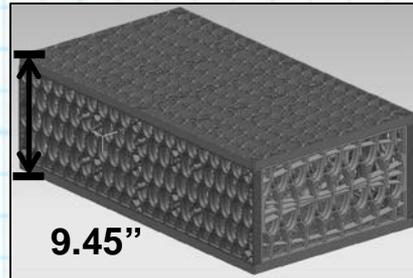
## Quality Assurance/ Quality Control (QA/QC):

- **All Components of the FocalPoint System are sold as a bundle to provide raw material quality control.**
- **Laboratory Ksat batch testing**
- **Post activation/in-situ field testing of flow rate**



# High Performance Underdrain:

9.45" Modular Tank, or "Flat Pipe" w/95% Open Surface Collects Water Efficiently.



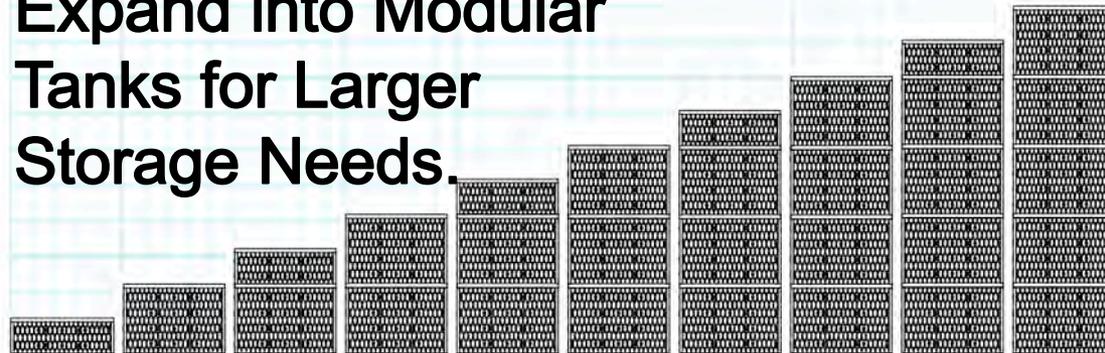
System Depth 36

2" Low-Profile Panel Addresses Shallow Applications.

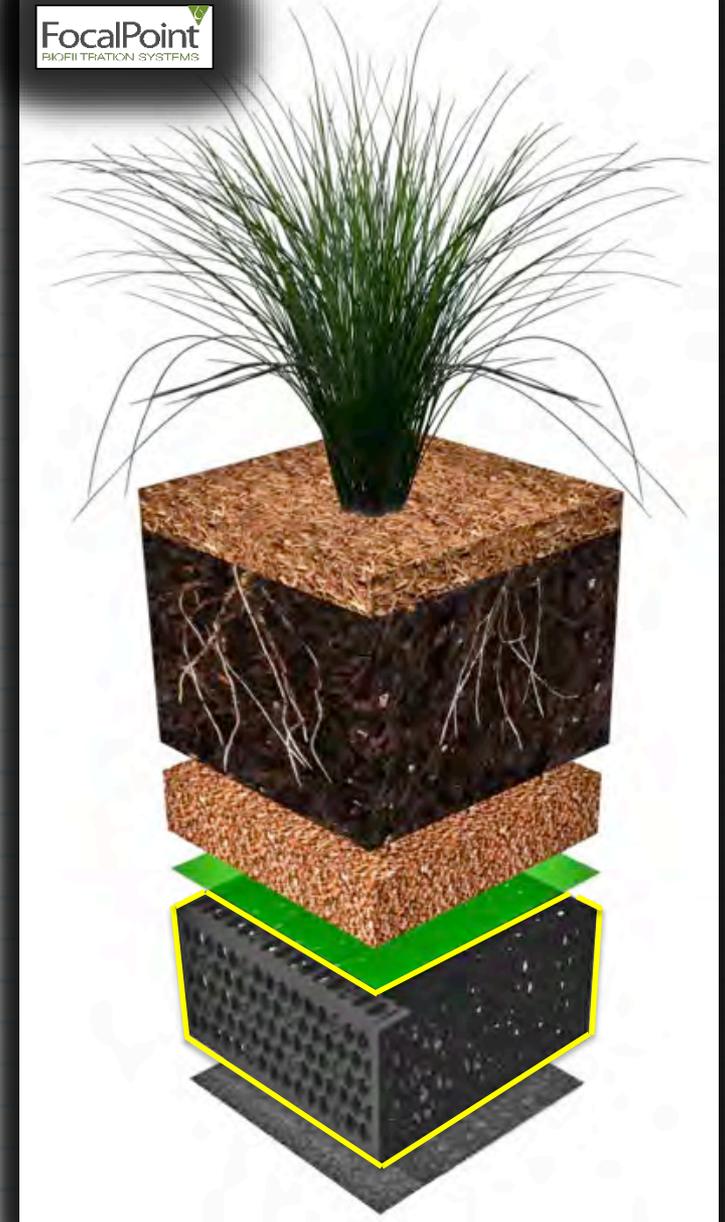


System Depth 29

Expand into Modular Tanks for Larger Storage Needs.



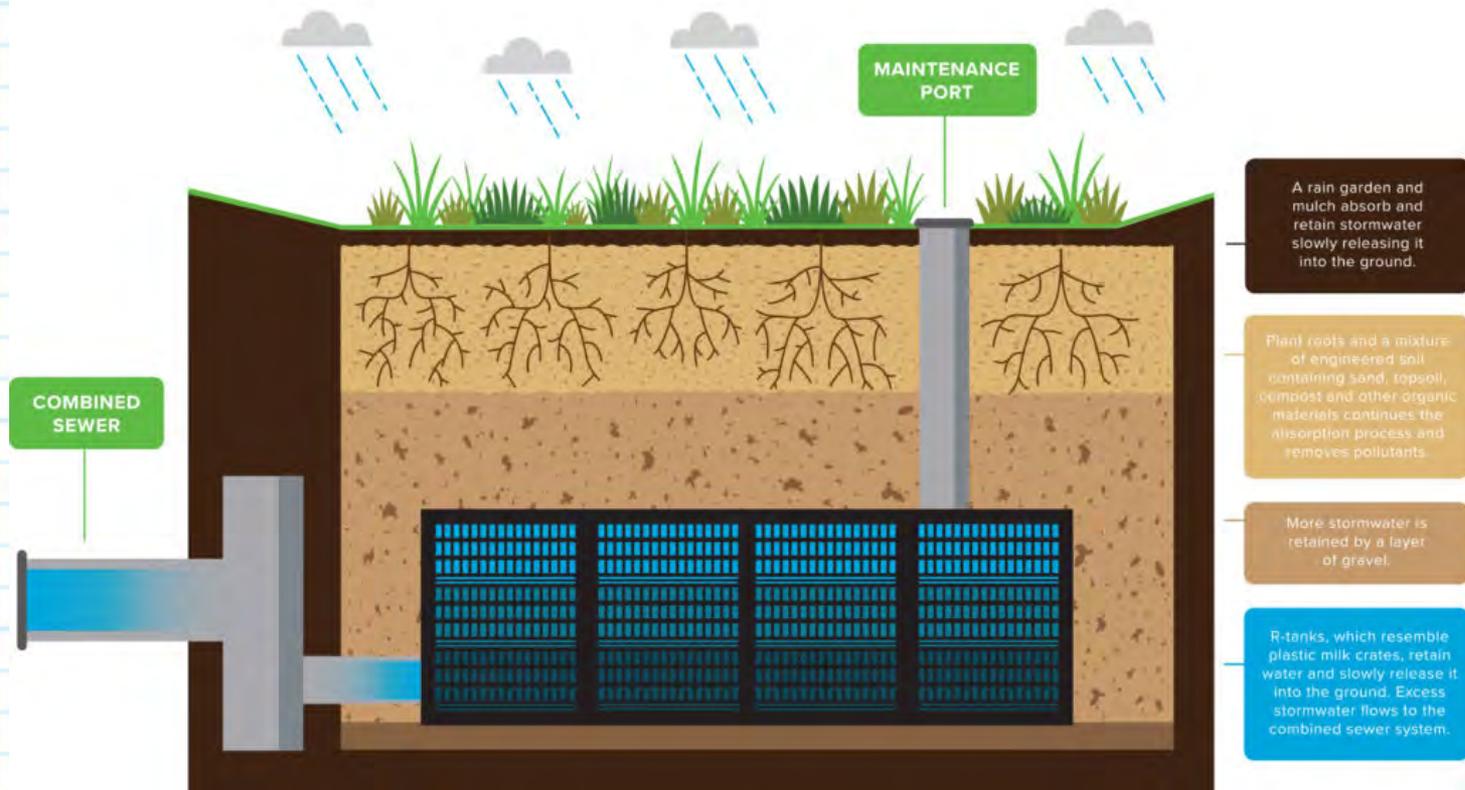
FocalPoint  
BIOFILTRATION SYSTEMS



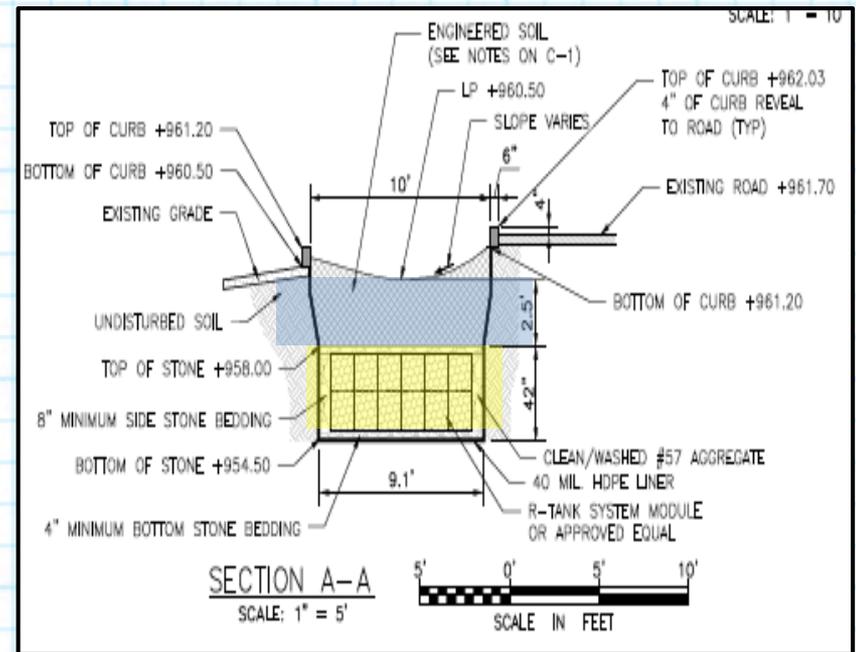
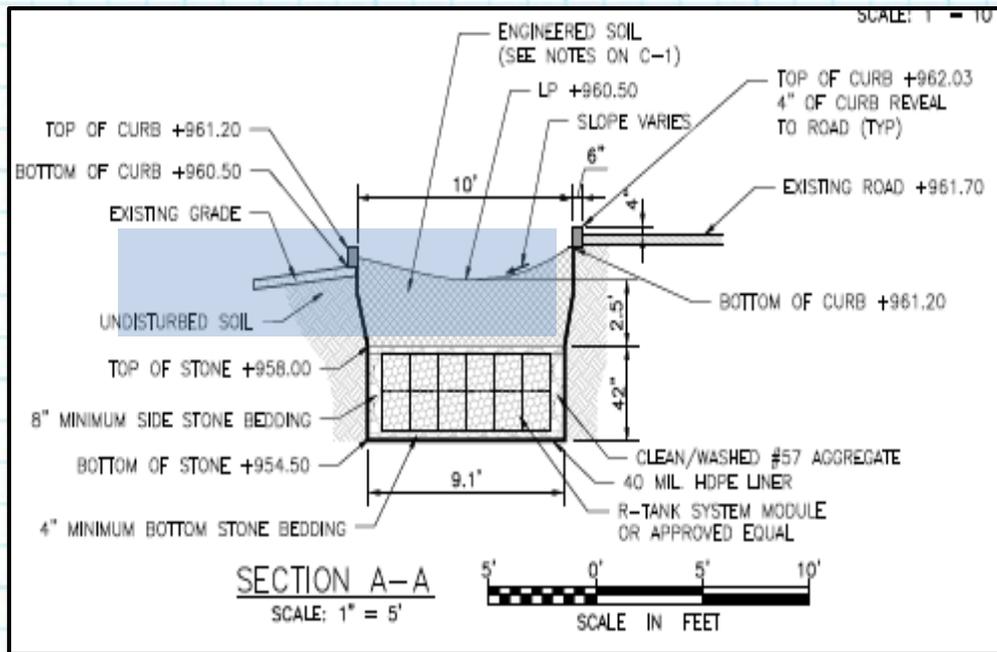
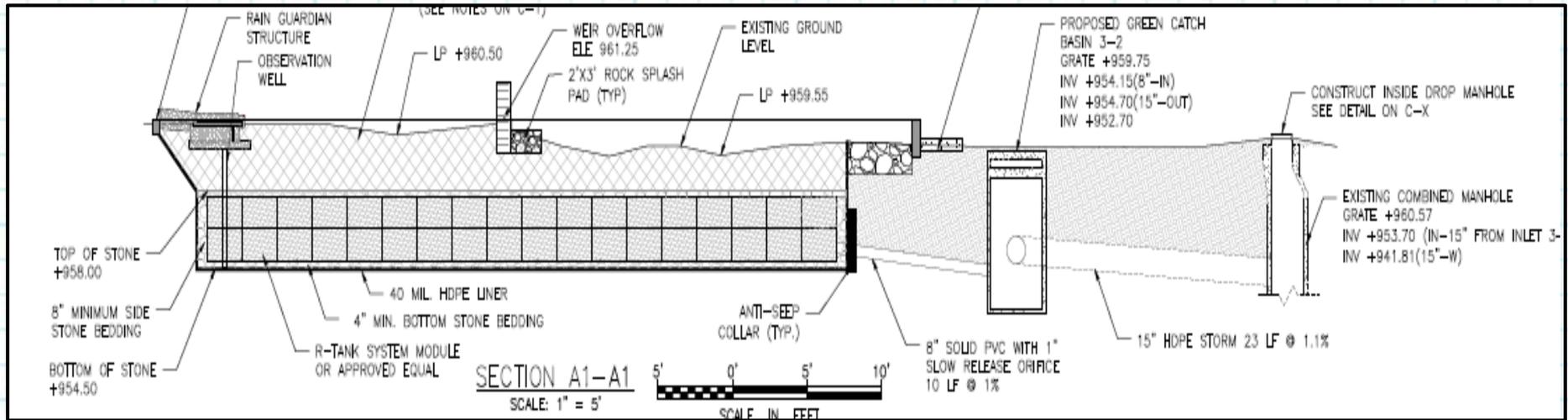
# Municipal Stormwater



## Layers and Cross-Section of a Bio-Retention System



# OPTIMIZING BIORETENTION WITH R-TANK



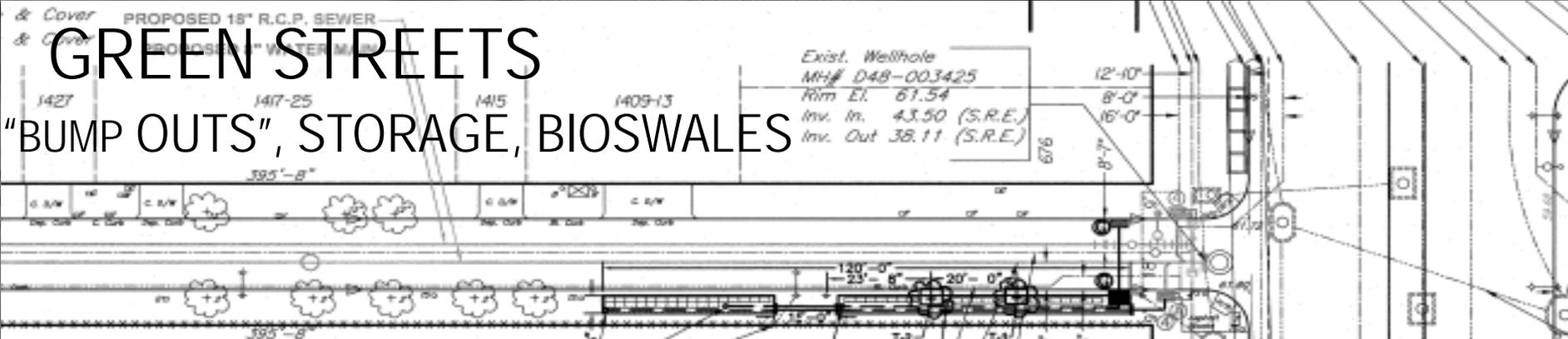






# GREEN STREETS

## "BUMP OUTS", STORAGE, BIOSWALES



### Rosedale Runoff Reduction Project

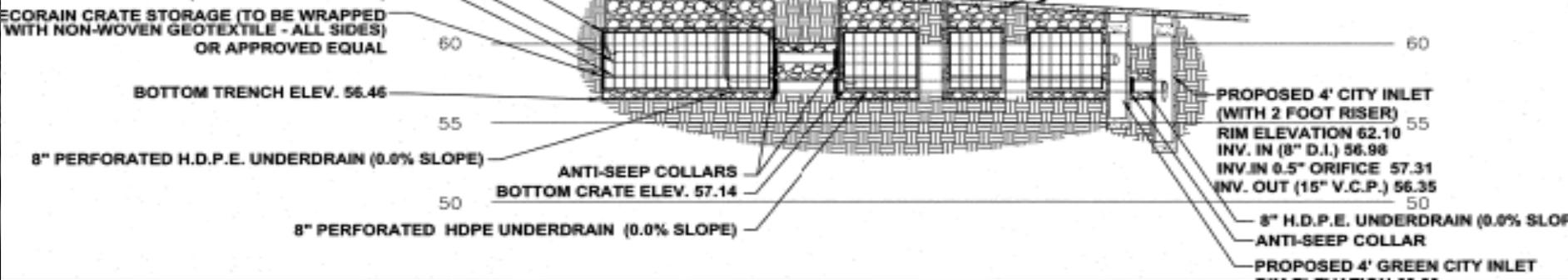
NINE MILE RUN  
WATERSHED ASSOCIATION

**FORNERS**  
Department of Environmental Protection (DEP)  
Building Greenest Program  
Kathleen King-Melton, Program Manager

**PARTNERS**  
NCDPDC  
Clemson University  
City of Greenville, S.C.  
City of Newburgh, N.Y.  
City of Pittsburgh Planning Dept.  
City of Pittsburgh USA  
Operation: Redline Beach  
Pittsburgh Public Schools  
PMA  
Randy Kay, 43 County  
State Technical Aid Center  
Western Piedmont Community College

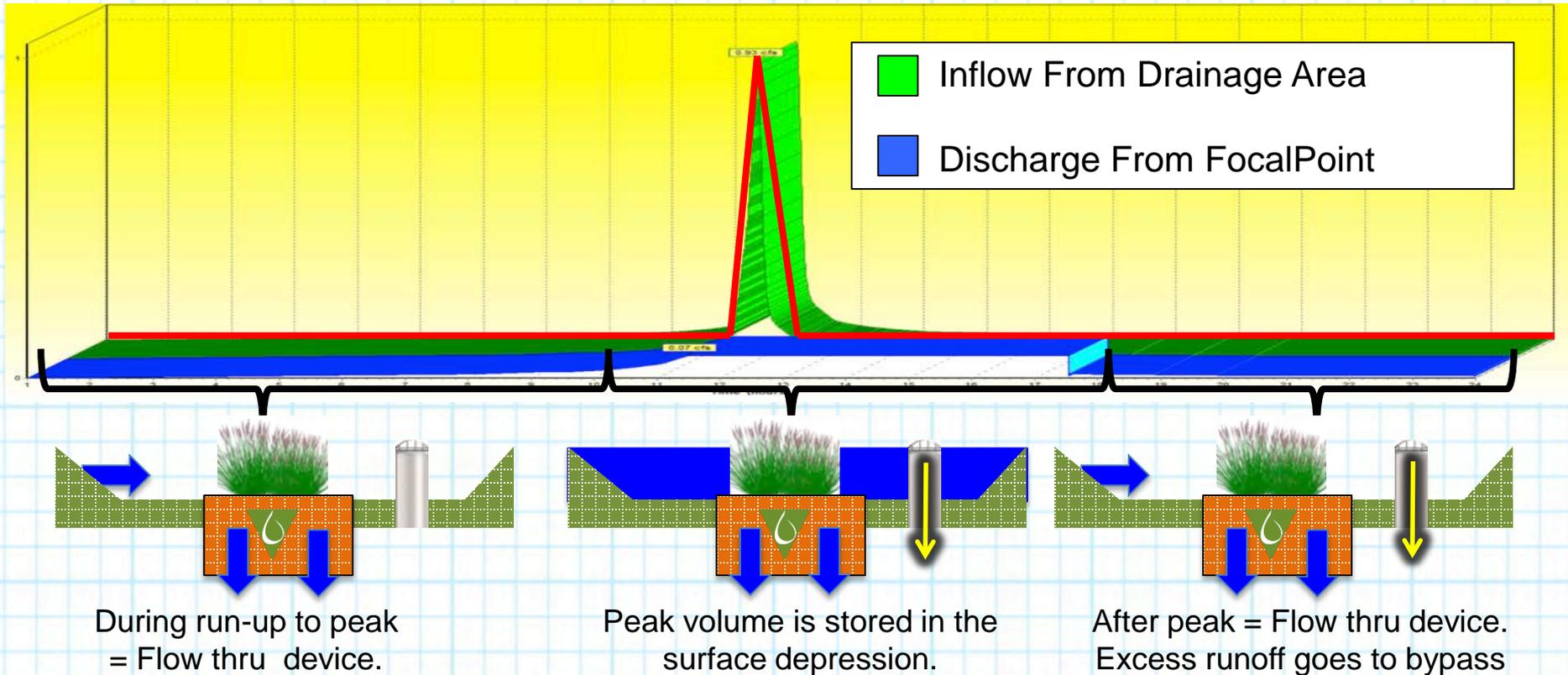
**DESIGN TEAM**  
PMA Collaborative  
Landscape Solutions  
Spartanburg, SC

This site will be the location of a green stormwater infrastructure project that will manage rain runoff from Tulip Street through a series of rain gardens on school property. It is part of a larger effort led by the Nine Mile Run Watershed Association to reduce sewage and stormwater runoff into the Nine Mile Run stream in Frick Park. For more information please visit [www.ninecreek.org](http://www.ninecreek.org)



# FocalPoint TR-55 Rainfall and Distribution Based Sizing: New Construction (Full Event) Design

— = Water Quality Volume    — = FocalPoint Treatment    — = Volume > WQv to bypass





# GREEN ROADWAY PROJECTS





PM17-25 WIN/12/2012

Construction Issues: Erosion Control

## CAUTION: BIOFILTRATION SYSTEM

### DO NOT REMOVE GEOTEXTILE COVER

*No quite la cubierta geotextil*

### DO NOT PLACE SOIL ON TOP OF ENGINEERED MEDIA OR COVER

*No coloque tierra en la parte superior de la cubierta protectora*

### DO NOT STOCKPILE DIRT OR HAZARDOUS MATERIAL UPSTREAM

*No acumular tierra o materiales peligrosos en el canal de drenaje*

**CAUTION:** This FocalPoint Biofiltration System is an engineered stormwater treatment system. It must not be compromised prior to activation by Construction EcoServices. Do not remove the protective geotextile.

**PRECAUCIÓN:** FocalPoint Biofiltration System es un sistema de tratamiento de agua de lluvias. La cubierta protectora no debe ser removida u abierta, antes de ser activado solamente por Construction EcoServices

#### ACTIVATION PREREQUISITES

*Requisitos de activación*

#### 70% OF THE DRAINAGE AREA MUST BE STABILIZED

*El 70% del área que rodea el drenaje debe ser estabilizada*

#### STREET/PARKING MUST BE SWEEPED

*La calle / estacionamiento debe ser barrido*

#### 90% OF THE SWALE MUST BE VEGETATED OR MULCHED

*El 90% del canal de drenaje debe tener por obligación vegetación o mulch*

**CONTACT CONSTRUCTION ECOSERVICES FOR ACTIVATION**

*Contactarse con Construction EcoServices para la activación*

**832.456.1000**



[WWW.ECOSVS.COM](http://WWW.ECOSVS.COM)



FocalPoint in the Divided Highway Median - Birnamwood Drive, Harris County, TX



High Performance Modular Biofiltration System: Merritt Road, Rowlett, TX

# PARKING LOT APPLICATIONS

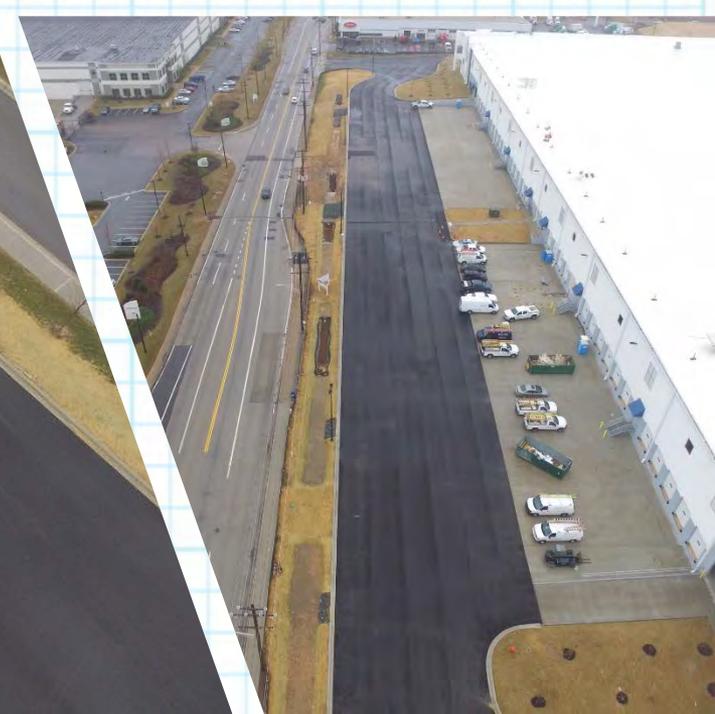
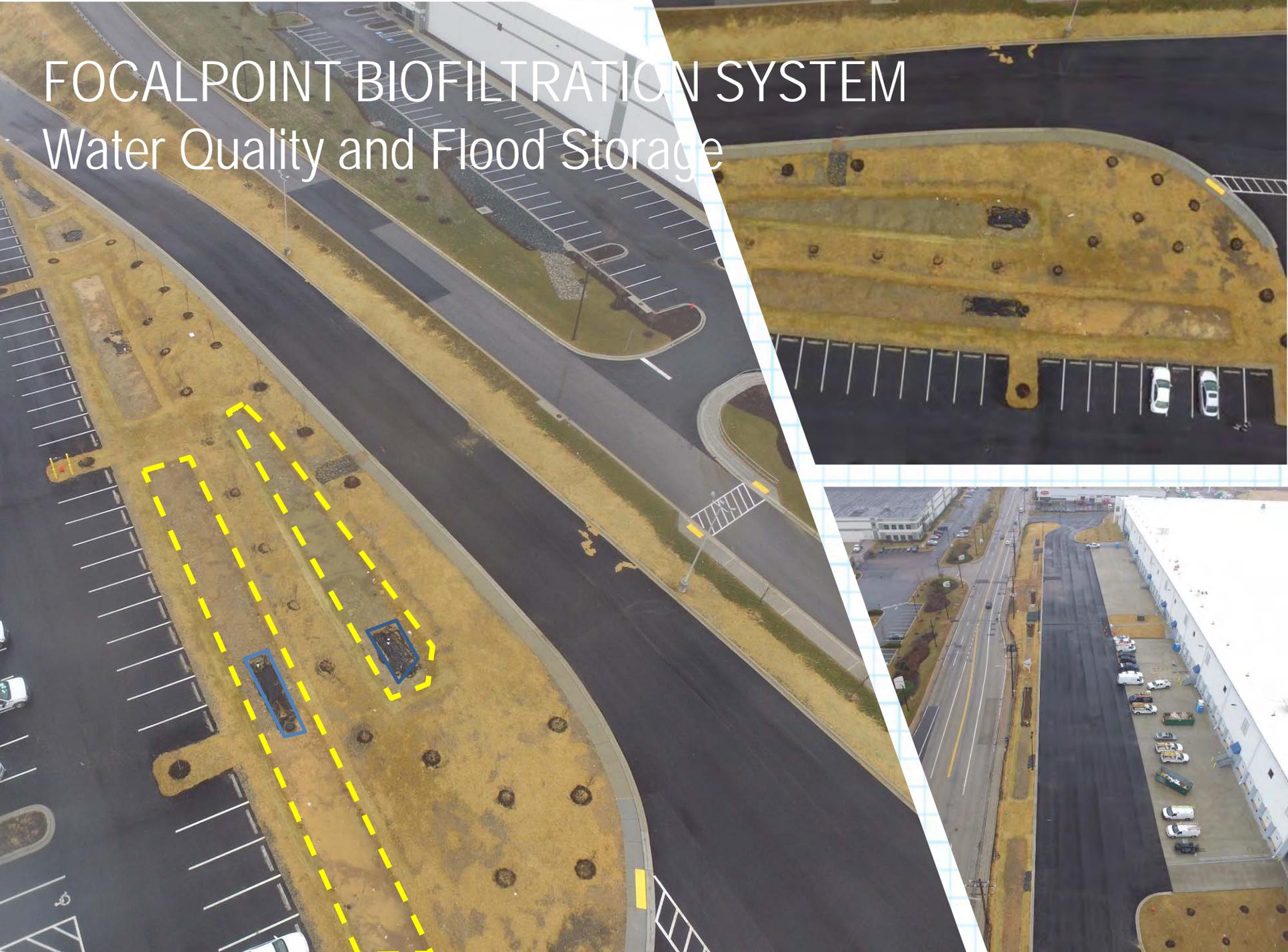






# FOCALPOINT BIOFILTRATION SYSTEM

## Water Quality and Flood Storage



# KITTERY TRADING POST – FOCALPOINT BIOFILTRATION SYSTEM

**FocalPoint**  
BIOFILTRATION SYSTEMS



# HIGH PROFILE RETAIL- FOCALPOINT BIOFILTRATION SYSTEM

**FocalPoint**  
BIOFILTRATION SYSTEMS



# FOCALPOINT BIOFILTRATION SYSTEM

## 3-year Time Lapse

2015 Install

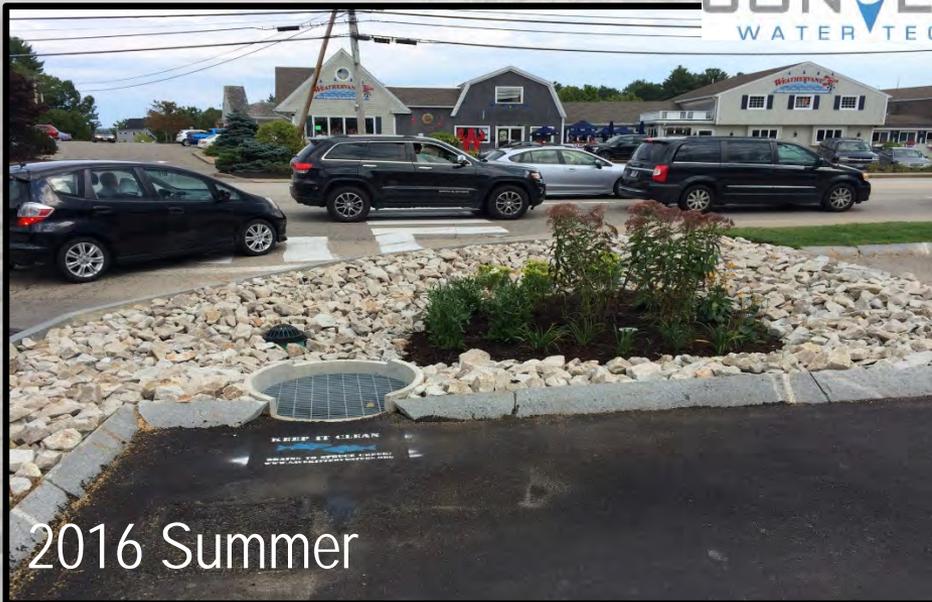


2016 Winter



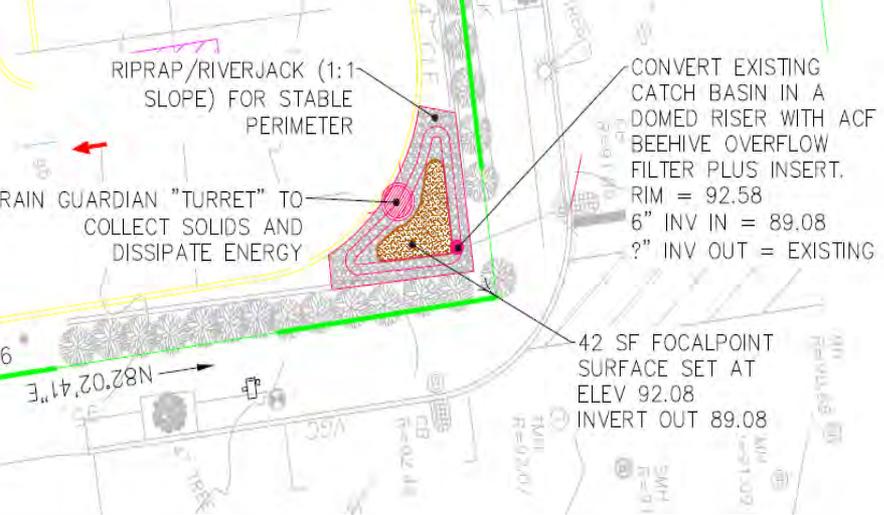
**CONVERGENT**  
WATER TECHNOLOGIES

2016 Summer



2018 Summer

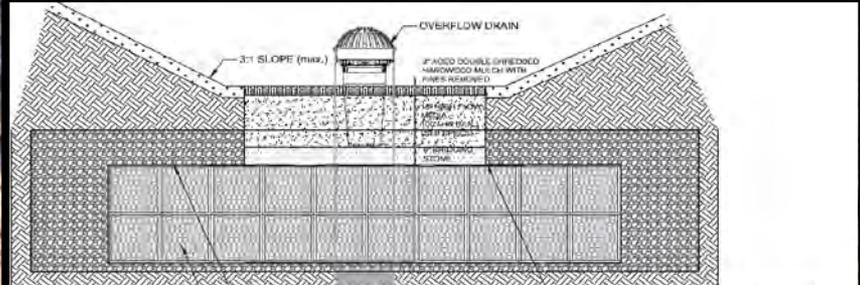




# FOCALPOINT BIOFILTRATION SYSTEM OVER SUBSURFACE STORAGE







OVERFLOW DRAIN  
 3:1 SLOPE (min.)  
 IF ADD'D DOUBLE WIRE MESH NARROWWOOD MULCH WITH FABRIC REINFORCED  
 GEOTEXTILE AROUND R-TANK AND UP SIDES OF FOCALPOINT  
 R-TANK SYSTEM - SEE PLAN AND SECTION FOR MODULE HEIGHT AND SYSTEM FOOTPRINT. SEE TYPICAL SECTION FOR STONE BASE, COVER AND PERIMETER REQUIREMENTS AND FOR GEGRID AND FABRIC LOCATION AND SPECIFICATION  
 FT-60 MICROGRID TO BE PLACE BETWEEN BRIDGING STONE AND TOP OF R-TANK AND TO EXTEND 12 INCHES BEYOND THE BRIDGING STONE FOOTPRINT



Thank You

