



PROJECT: GREEN ROADWAY

CLIENT: HARRIS COUNTY PUBLIC INFRASTRUCTURE DEPARTMENT

DATE COMPLETED: JUNE 2012

PROJECT BACKGROUND

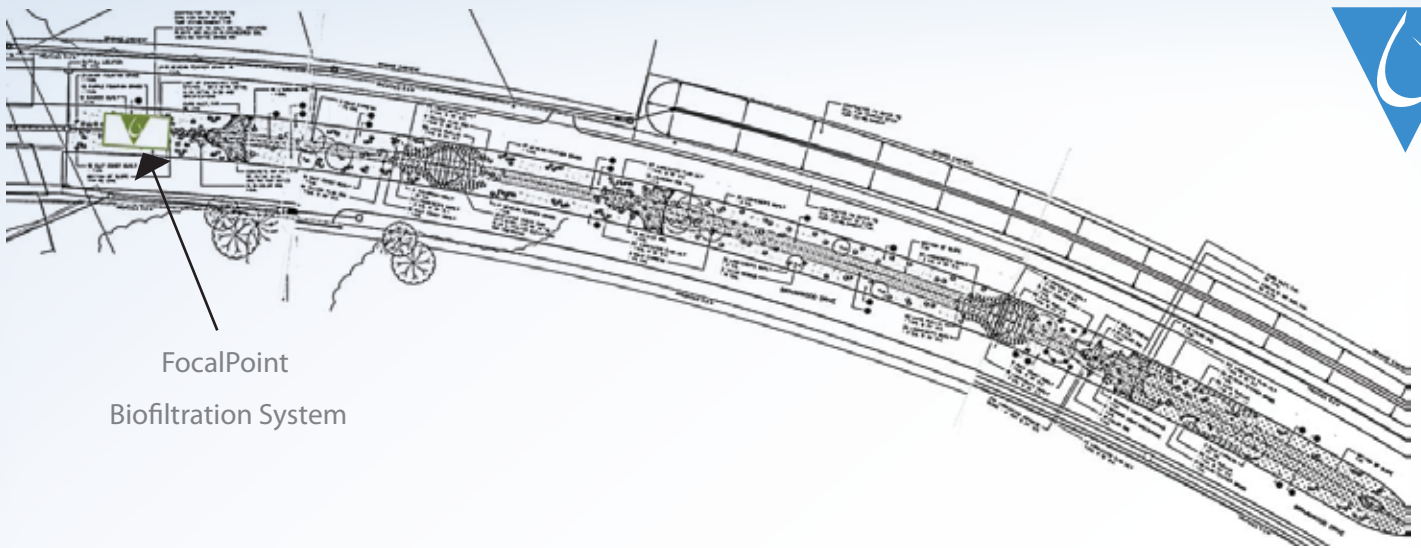
Birnamwood Drive is located in northern Harris County, east of Spring, Texas. The existing roadway runs north/south between Fern Hill Drive and intersects Cypresswood Drive. The new section of Birnamwood is approximately 0.68 miles in length and extends from Fern Hill Drive north to Spring Creek Drive. This project is the first roadway project in the Houston area to implement Low Impact Development (LID) techniques and is viewed by Harris County as a stepping stone to implementing LID as its default roadway design approach throughout the County.

Design Team

Landscape Architect
Knudson Landscape Architecture
Civil Engineer
Klotz & Associates

Construction Team

Installer
Construction EcoServices
Landscape Contractor
Bio Landscaping



FocalPoint
Biofiltration System

During the design and consultation phase of Birnamwood Drive, it was important to consider all possible problems that might arise in the construction and maintenance of the roadway. Utilizing a dry swale as the primary conveyance feature, the design team explored the various biofiltration medias available for filtering vegetated pollutants.

Option 1: Typical Low Flow Media

The design team first examined typical engineered biofiltration medias that have a flow rate of less than 5" per hour and are relatively inexpensive to make and supply. However, due to the low flow rate a designer is required to use almost 900 SF of bioretention surface area per acre of impervious drainage surface. This requires a lot of space, and extensive costs related to excavation, stone, underdrain, and media. The upkeep of these larger systems are also much more difficult due to the roadway maintenance organization's sensitivity to specialized maintenance needs.

Option 2: High Flow Media

High performance media design which offers a flow rate of 100" per hour was a better answer. For the needs of Birnamwood Drive, only 70 SF of infiltration bed surface area per acre treated was required. The small footprint, allowed the design team to use two small Biofiltration systems, one in each of the two swales in the center median of the roadway, leaving everything upstream of the systems to be designed with traditional landscaping and maintained without LID related considerations. Lower construction and maintenance costs, along with improved constructability made the high flow media design the logical choice for Birnamwood Drive.



FocalPoint Biofiltration System

The FocalPoint Biofiltration System is a combination of a high performance flat pipe underdrain, a bridging mesh that is clog proof, bridging stone, and a high performance biofiltration media that flows at a rate of over 100" per hour. What this unique combination of parts creates is a system that provides unsurpassed water quality and drainage characteristics. For the purpose of Birnamwood Drive, FocalPoint was able to do in 2,000 SF what the traditional bioswale design would have required a full acre of biofiltration surface area to accomplish.

Low Impact Development

Several Low Impact Development practices were utilized within the Birnamwood Drive depressed center median, including native landscaping, check dams, and the FocalPoint Biofiltration systems adjacent to each of the extreme event outfalls. The plantings were chosen based on their ability to maximize the filtration of larger debris particles, to adapt to the conditions for this area, and to minimize maintenance. The earthen check dams were designed to slow down the velocity of water flowing through the swale and extend time of concentration while the FocalPoint Biofiltration System was in place to filter contaminants out of the water prior to discharge into Spring Creek. In extreme rainfall events, runoff not filtered through the FocalPoint Biofiltration System is designed to bypass through an extreme event overflow directly to the outfall. The detention capacity of the center swale which can manage the 100 year storm, eliminated the need for offsite detention, an important but often uncalculated cost savings on LID-based roadways.