

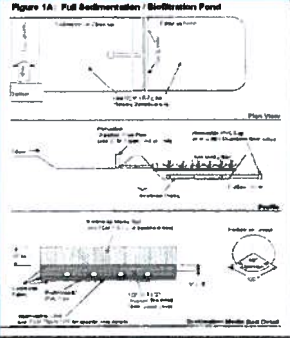
Biofiltration

Enhanced Pollution Removal with Planted Filter Media

- ## Agenda
- What is Biofiltration?
 - Purpose of UT Research Project
 - Findings of UT Research Project
 - Implications for the City
 - Ongoing ERM Research

What is Biofiltration?

- Similar to sand filtration
- Captures a volume of polluted storm water
- Storm water passes through filtration media
- Treated storm water exits the BMP through under drain



What is Biofiltration?

The difference is in the media

- *Mixture of sand and native soil*
- *Finer gradation*
- *More water holding capacity*
- *Media is planted*





Purpose of UT Research Project

- Draw on nationally respected research capabilities of UT's CRWR to:
 - Update knowledge of sand filter performance
 - Determine if biofiltration out performs sand filtration in pollution removal and reduced clogging
 - Recommend potential improvements to design and maintenance criteria

Findings of UT Research Project: Sand Filter Data Analysis

- Analyzed COA monitoring data for sand filters
- Efficiency ratio for TSS found to be 91% for TSS (currently 87% in ECM)
- Efficiency ratio for Total Phosphorus found to be 69% (currently 61% in ECM)

Findings of UT Research Project: Biofiltration Experiments

- Three media were tested
- COA sand filter media (control)
 - Masonry sand (finer than COA sand)
 - COA biofiltration media

Synthetic storm water was passed through columns and influent/effluent quality measured

Tested with and without a saturated zone

- Tested with and without vegetation
- Buffalo Grass
 - Big Muhly



Findings of UT Research Project: Pollution Removal

- Comparing two test columns
 - Sand with no plants or saturated zone
 - COA biofiltration with Big Muhly and saturated zone
- TSS removal increased from 88% to 97%
- Total Nitrogen removal increased from 65% to 83%
- Total Phosphorus removal increased from 58% to 94%
- Fecal Coliform removal increased from 91.7% to 98%

Biofiltration Study Conclusions

- Significantly more nutrient removal with planted biofiltration media
- Early indication that plant roots maintain hydraulic conductivity
- Submerged zone improves performance and supports plants

Implications for City

- Potential to improve our City's water quality
 - Biofiltration is setting a new standard for storm water treatment
 - Many existing sand filters could be retrofitted
- Upcoming ECM changes:
 - Refining biofiltration criteria in ECM 1.6.7
 - Removing compost from COA biofiltration media to prevent nutrient leaching
 - Recommend addition of saturated zone
 - Planning to update efficiency ratios for sand filtration in ECM 1.6.5 (FY 12)

Ongoing ERM Research

- Will plant roots maintain hydraulic conductivity long-term?
- What is seasonal performance?
 - Study showed lower nutrient removal during plant dormancy
- Long term plant survival in sandy media

