

Applied Ecological Services Experience with Creation, Design, Construction, Management and Monitoring of Wetland Biofiltration Systems

Applied Ecological Services, Inc., has designed, engineered, constructed or overseen the construction of numerous wetland biofiltration projects. Project goals have been to clean up macronutrient-burdened water from industrial sources, agricultural systems and sewage treatment facilities. Septic management has been involved in many projects where biofilters have been created to manage stormwater quality. Biofilters provide an effective low-cost strategy for cleansing stormwater to reach national and state water quality standards. Wetland biofilters have also been found to remove or stabilize many chemical constituents far better than very high-cost engineering solutions for water quality enhancement.

The following briefly describes a few examples of biofiltration projects conducted by Applied Ecological Services.

EPI Landfill Wetland Biofilter Muskego, Wisconsin

AES designed, engineered, provided construction oversight and performed the planting for this two-acre wetland biofilter. The biofilter was designed to manage surface stormwater runoff and leachate materials for a large municipal waste landfill. Monitoring results have shown the site is functioning very effectively in reducing sediments, absorbing nutrients, removing floatable debris, and in containing chemistries and chemical constituents. Without the biofiltration benefits of this specialized wetland, these materials would have otherwise been released directly into an adjacent existing large natural wetland system. The wetland design included a sediment trap, a pretreatment wetland cell, and a maze of created wetland channels through a created wetland system followed by a passive outlet of the water into an upland prairie buffer. The buffer of deep-rooted prairie vegetation further infiltrates stormwater before it leaves the project area.

***Brown County, Van de Hey Landfill
Green Bay, Wisconsin***

AES designed, engineered, prepared all calculations, planting plans and specifications and negotiated with permitting agencies to determine wetland biofiltration units for a 160-acre landfill. The biofilter, designed both for stormwater management and water quality enhancement, is a large facility of 20 acres. The site was designed to improve water quality anticipated with the build-out of two very large landfill cells prior to release of stormwater into adjacent tributary channels to stream systems.

***Prairie Lakes Project
Homewood, Illinois***

Working in collaboration with several other team members, AES conducted design, engineering, construction oversight and planting assistance for this 6 ½-acre wetland biofilter. This unique project incorporated a pretreatment cell designed to trap sediments, followed by a labyrinth of wetland swales that course through the biofilter. A critical goal of this project was the improvement of water quality in Prairie Lakes, a created lake system within an industrial park campus which also promoted public recreation and fishing benefits. Extensive monitoring of the water quality upstream, throughout the biofilter and downstream of the biofilter has produced data that suggests excellent filtration benefits of the wetland project. A series of publications and graduate degree thesis projects will result from the design and installation of this facility.

***Sugarlin River Residential Development
Lorain County, Ohio***

A progressive residential developer in Ohio retained AES to investigate and design a wetland biofiltration system to enhance septic leachate water resulting from a proposed new community along the Sugarlin River. AES also conducted all regulatory negotiations for permitting this project. The design of the project involved extensive surveying, preparation of concept and preliminary engineering drawings, preparation of ecological specifications, and negotiations with the Federal, State and County regulatory agencies to address the permitting needs.

***Prairie Crossing
Grayslake, Illinois***

Prairie Crossing, a 677-acre residential development has been acclaimed as a national model of ecologically sensitive “conservation development”. As the ecological consultant to the project, AES worked with other members of a multi-disciplinary team to design, engineer and construct a “Stormwater Treatment Train” biofilter. The Stormwater Treatment Train was developed to enhance water quality associated with stormwater runoff from roadways, residential yards, and other commons areas within this residential development. Modeling and projections of the water quality benefits were completed and some basic monitoring of performance is now occurring. The Conservation Development approach of Prairie Crossing has since become a national trend, using upland and wetland biofiltration systems for water quality enhancement. Numerous publications on the project are available.

***Streator Trailer Park
Streator, Illinois***

AES and other partners conducted a due diligence investigation to explore alternative ways to manage over 300 failing septic systems within a trailer park that had received a series of non-compliance notices regarding septic failure. AES prepared conceptual and preliminary plans and conducted more detailed design and engineering calculations for a wetland biofiltration system to address the major septic failure problems at this trailer park.

***Shell Oil Gas Station
Buffalo Grove, Illinois***

As a subcontractor to a large Chicago area engineering firm, AES worked together with team partners to explore wetland biofiltration strategies for a parking lot stormwater runoff and runoff from a car wash associated with a new gas station and car wash facility. A wetland biofilter was installed on this project.

***Spittler House Septic
Cleveland, Ohio***

AES recently provided initial preliminary concepts for using small, created wetland biofilters for treating septic associated with a proposed household near Cleveland. In soil types known for septic failure, the project is soon to go to a final engineering design and development phase. The process has also included preliminary negotiations and confirmation with the County, State and Federal regulatory agencies on the feasibility of this alternative for septic management.

***Fox Mill Development
Kane County, Illinois***

AES and partners were retained to explore alternatives to land application of supernatant waters from a land application sanitary management system. AES conducted preliminary and conceptual planning for a wetland biofilter system with under-drainage to address macronutrient loading concerns in soil types that had very high water tables. The under-drainage system proposed by an agriculture tiling company was designed to provide separation between the sanitary supernatant waters in the biofilter and the shallow ground water.

AES has been involved in numerous other projects where wetland biofiltration has been basic to a site design plan. This has included biofiltration systems for addressing runoff and leachate from mined lands, fly ash disposal facilities associated with coal-fired power plants, liquid management facilities from a slaughter house, wetland biofilters to address agricultural mineral management leachate, and other settings in which stormwater management and typical,urban water-borne contaminants were being addressed.

For more information or to inquire about potential projects, please contact our Consulting Division at 608.897.8641, fax 608.897.8486, or email AppliedEco@Brodnet.com.