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2008 Officers

MESSAGE FROM YOUR PRESIDENT

Well, I guess it is my turn to write the Presidents portion of the journal. So many awesome people have held the president's pen for the Indiana Environmental Health Association. I hope I can live up to the expectations!

I want to give you words of wisdom, encouragement, and support…..even though I know you work in a thankless field where you protect human life in so many areas. Your budgets are being cut and with that your prospect of getting a raise may have flown out the window. When we hear cut in budget usually the first thing to go is money for valuable training opportunities.

So are there words of encouragement that can be given…..YES! Remember you don't work for "county/state" you work for the people of your counties and state. They need you to protect them from the hidden dangers of foodborne illness, failing septic systems, mosquitoes, poor drinking water; the list goes on and on. There are smart people in your counties but they are busy with life and don't think of the things listed above. Why are living conditions better now than 100 years ago…..people just like you!!!! People just like the ones who faithfully founded IEHA and it is an honor to continue their work.

As you read through the journal, take pride in your profession. Care about those who you work for. You are the champions of Public and Environmental Health. I take notice of you and thank you for doing an outstanding job in the state of Indiana.

Lisa Harrison, President
Indiana Environmental Health Association

Constructed Wetlands: A Green Alternative to Treat Both Human and Animal Sewage

By: Alfredo Garcia-Perez & Mark Harrison, LaGrange County Health Department

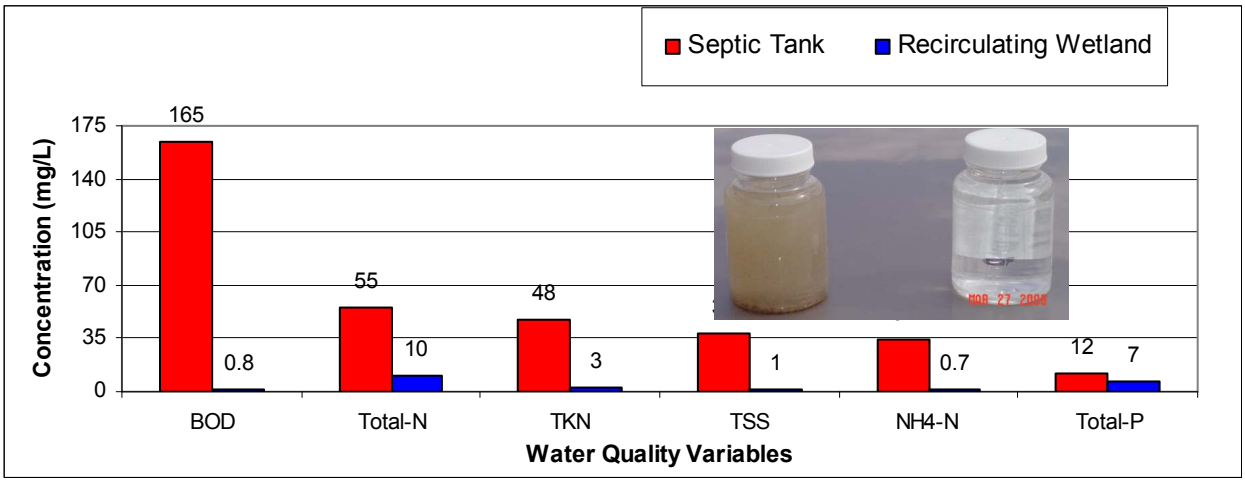
Abstract

Gravity subsurface constructed wetlands have been used for more than a decade in LaGrange County, Indiana to remove human sewage contaminants that could reach groundwater supplies. Performance of a subsurface constructed wetland (6 m x 6 m; 1.2 m deep) using a recirculating vertical flow to treat sewage from the county animal shelter is examined. The volume of sewage treated was assumed to be approximately 1817 L (480 gallons) per day generated by 18 dog runs, 12 cat cages, 2 isolation rooms and 2 employees. Septic tank versus constructed wetland effluent was periodically analyzed for Biochemical Oxygen Demand (BOD), Total-Nitrogen (TN), Total Kjeldhal Nitrogen (TKN), Total Suspended Solid (TSS), Total Phosphorus (TP), Ammonia-Nitrogen (NH_4^+-N), Nitrate-Nitrogen ($NO_3^=$-N) and Fecal Coliform bacteria (FC). Water analyses collected on-site included temperature, dissolved oxygen, oxygen-reduction potential and pH. The treatment efficiency has been high after 348 day's operation. Average treatment removal efficiencies for BOD, TN, TKN, TSS, TP, NH_4^+-N and FC were 99%, 82%, 94%, 99%, 42%, 98% and 99% respectively. The Nitrate-Nitrogen mean final concentration was 7.6 mg/L, and the dissolved oxygen concentration increased from 1.9 to 5.0 mg/L. Results are promising with respect to using a recirculating vertical-flow constructed wetland as a viable green alternative technology to treat both human and animal sewage.

Introduction

Conventional septic systems are commonly used to treat residential sewage in areas without sanitary sewer. However, they are considered a primary contaminant source for surface or underground water supplies (Whitehill et al. 2003), including residential water wells (Bhardwaj 2003). Horizontal Gravity Flow (HGF) subsurface constructed wetlands have been used for more than a decade in LaGrange County, Indiana to remove human sewage contaminants. Currently, around 200 HGF constructed wetlands are working in LaGrange with daily flow from 150 gallons per day (GPD) to a cluster system handled by the LaGrange County Sewer District for 50,000 GPD. The HGF wetlands provide acceptable removal efficiency for the biological oxygen demand (BOD), total suspended solids (TSS) and fecal coliforms (FC) bacteria, but low efficiency to eliminate nitrogenous compounds because limited oxygen transfer. García et al. (2006) did show that modifying the horizontal and gravity flow to a vertical and recirculating flow the oxidation process of ammonia, which is the predominant form of Nitrogen in septic tank effluents; can achieve low levels plus improving BOD and TSS removal before land application and surface or underground discharge. Performance of a subsurface constructed wetland using a recirculating vertical flow to treat both human and animal sewage from the LaGrange county animal shelter is examined.

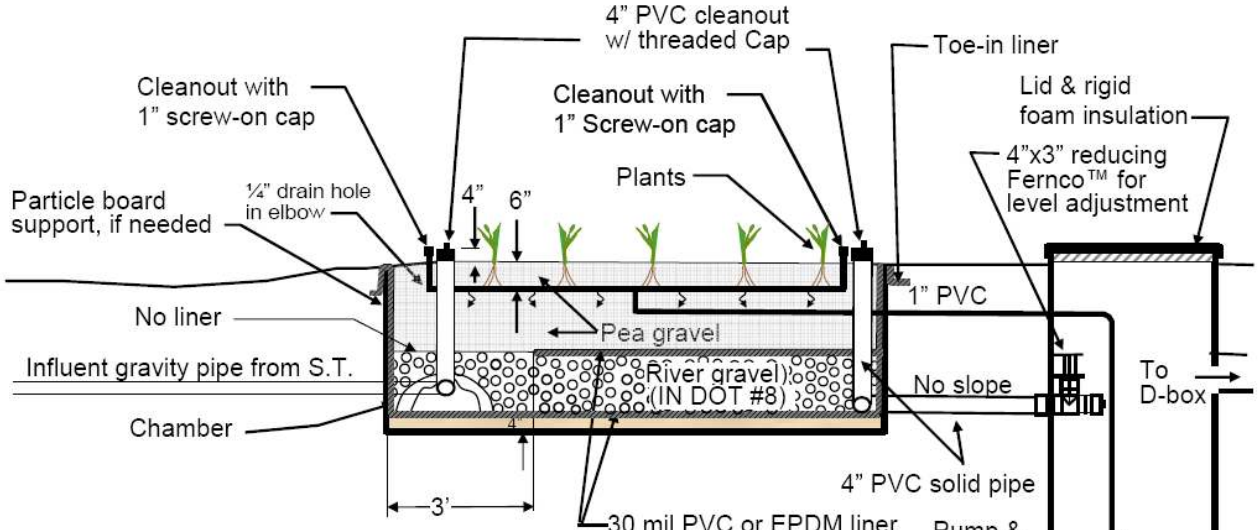
Results & Discussion



Like natural wetlands; artificial or constructed wetlands filter out the excess of nutrients and contaminants present in the septic tank sewage by trapping them in the gravel layers and plant roots where microorganisms (bacteria, fungi, etc) digest wastewater down into less harmful substances releasing a biologically purified effluent. The recirculating design creates very favorable conditions especially providing and making available dissolved oxygen to support nitrogen oxidation.

Materials and methods

Constructed wetland using a re-circulating vertical flow pattern.



- Upper liner between stone layers, ¾ length of wetland, from effluent end towards inlet
- Min. wetland depth =42" (18" screened washed river gravel under 24" clean pea gravel) Max. depth = 48" (18-20" clean river gravel under 28-30" clean pea gravel)
- Excavate at least 48" below final grade & place at least 4" fine to coarse sand (free of rock & debris.) Level & compact sand.
- Pump Station – Use 2' dia. smooth core solid field tile of culvert, installed vertically

Recirculating Vertical Wetland Cross-Section

Conclusions

This study shows that the vertical and recirculating flow constructed wetland built in the LaGrange County Animal Shelter, Indiana had high treatment efficiency in decomposing organic material (BOD) and removing the particulate material suspended (TSS) in the sewage. Fecal Coliform (*E. coli*) bacteria, which is in indicator that other more dangerous bacteria could be present, was removed up to 99%. The final effluent has low chemical concentration for the different forms of nitrogen present. TKN (Total Kjeldahl Nitrogen which is the sum of Ammonia Nitrogen (NH3) plus organic Nitrogen, such as proteins). TN (Total Nitrogen) is the sum of all nitrogen forms present in the effluent (TKN + NO2- (Nitrite) + NO3- (Nitrate)). The results indicated that a constructed wetland is a viable green alternative technology to pre-treating conventional human and animal septic system effluents before land application and surface or underground discharge. This system was shown to be suitable for residential or commercial projects generating sewage up to 480 gallons per day. Another green practical application for constructed wetlands has been treating agriculture effluents like those generated by poultry and porcine activities. Also, this kind of constructed wetland systems could be easily integrated into the aquaculture activities to treat on-site its effluents before they are finally discharged

Literature cited

Bhardwaj, V. 2003. Preventing Well Contamination. Tech Brief On Tap Magazine 3:1-4.

Garcia-Perez, A., B. Grant and M. Harrison. 2006. Water Quality Effluents from a Recirculating Vertical-Flow Constructed Wetland for Treating Residential Sewage in LaGrange County, Indiana. Small FlQuarterly 4:34-38. http://www.nesc.wvu.edu/nsfc/Articles/SFQ/SFQ_f06_PDF/Juried2.pdf

Whitehill., T. J., P. E. Brian Tercha, and J. F. Davis. 2003. Evaluation of a Recirculating Sand Filter Followed by a Subsurface-Flow Constructed Wetland to Achieve Denitrification. Small Flows Quarterly 4:30-35.

To All Central Chapter Members:

By: Jennifer Warner, Johnson County Health Department, Central Chapter Representative

I am the Central Chapter Representative and have been an active member since 1990. I have seen the ups and downs of the association over the years and would like to see our chapter members step up to the plate this year. Despite our large chapter member base, I am discouraged by our attendance records. I know that we all have busy schedules and too many committee meetings to attend, but take a moment to think about the importance of the chapter to you. I know I have benefited by participating in the monthly meetings in many ways. Over the years, I have made friends, established business contacts, and even obtained my job at the Johnson County Health Department. I implore each and every member to make an effort to attend at least 1 more meeting than in the past. You will be surprised at what information you may be able to learn at the meetings. Below you will find the 2008 meeting schedule. Please make an effort today!

All Central Chapter Meetings are on Wednesday's. The dates are as follows:

March 19	August 20
April 10 (Spring Conference)	September 29 to October 1 (Fall Conference)
May 21	October 22
June 25	November 19
July 23	December 17

Membership in the organization deserves great participation and involvement.

The almost insoluble task is to let neither the power of others, nor our own powerlessness, stupefy us.Adorno, Theodor W. (1974),