I have been in the Landscape/Grounds care business for 40 years. I was involved in many of the condo convertions in this area during the 80's up to present time. I speak as an expert in this field. There are a host of problems with this project in many ways, however I will list only enviromental impacks in this letter since this a wetlands meeting.

1) Clear cutting 16 acres of pristine wood lands removing all the trees and vegetation that form an important ecosystem on its own. This wood land is home for Thousands of creatures from deer, raccoons, squirls, wood chucks, bob cats, frogs snakes, toads, wild turkey, insects, and many more. Clear cutting will kill and destroy their homes and food sources. There is also a federal protected Pileated woodpecker in these wood lands. I have a picture and documentation.

2) If the project is allowed to proceed clear cutting of the trees will leave both the trailers being built in this dense living conditions (48 trailers on approx 10 acres of this site. But also The existing homes and roadways that border The development prone to flooding. The trees currently remove 100's of gallons of water

from the soil every day, without these trees and vegetation the water will have no place to go than the surrounding homes. This could become quite disasterous during heavy rain storms, who will pay for the damage.

3) large retention pond in back of homes and clark lane middle school. Retention ponds when not properly constructed but more importantly monitored and maintained for its life time an expensive and time consuming project on its own. Who will be responsible to oversee this and pay for it. Not only now but two years, five years, 10 years from now. There is no over sight on this. This will be a private development run by the developer. How do we insure this very important element. This has the potential to become a mosquito breeding ground, Mosquitos are The most dangerous creatures in the world. Now that its natural predators will be wiped out by the clear cutting of the woodland, we will have a large unchecked mosquito population behind The homes that surround Th... development but more importantly our middle school (Clark lane middle school) that currently has 581 students Plus teachers. Our we willing to risk our children so one man can make money.

mosquitos transmit a host of diseases from Malaria, yellow fever, Dengue, and Encephalitis, west Nile and more. They infect 10 of millions of people each year. This is a safety issue and must not be allowed.

Maintenance and monoriting retention ponds require professional. They must be kept clean of trash, sediment that can obstruct outlets.

Erosion on the slopes must be controlled excessive vegetation in and arounel the ponds must be controled.

Pilot channels must be kept clear and opened.

All mechanical, pamps, floodgates must be kept fuctoning properly.

Maintenance and monorating is expensive and ongoing for the life of the pond. failure to do so can result in flooding, algae growth and a breading grounels for mosquitos. Also as a pollution treatment basin, allowing access down stream.

Retention Pond Maintenance

A poorly maintained retention pond is doomed to fail. If the pond is not owned by the local government, it is the obligation of the association to keep it in functioning order, as well as any costs incurred.

This includes regular inspections to identify and repair areas of erosion, gullies, and

This includes regular inspections to identify and repair areas of erosion, gullies, and other damage, especially after severe storms or heavy rain; removing sediment and debris from the pond before it reaches the outlets; and beautifying the surrounding banks with grass, shrubs, and other vegetation.

When the pond is out of sight and/or there is no plan in place to consistently maintain it, simple maintenance such as mowing, garbage and litter cleanup, modest landscaping, sediment removal, and slope stability are typically overlooked. Bringing a neglected pond up to code can be a significant, unexpected cost as well as a

cost as well as a disaster for the environment.

Failures within the pond and property damage downstream might cost hundreds of thousands of dollars. Don't forget about the attention from local government agencies, as well as the possible fines that come with a failed pond.

Structural Pest Control

Mosquitoes and Disease

What's the most dangerous creature on earth? Without question the answer is: the mosquito. Mosquitoes and the diseases they spread have been responsible for killing more people than all the wars in history. Even today, mosquitoes transmitting malaria kill 2 million to 3 million people and infect another 200 million or more *every year*. Tens of millions more are killed and debilitated by a host of other

more *every year*. Tens of millions more are killed and debilitated by a host of other mosquito-borne diseases, including filariasis, yellow fever, dengue and encephalitis.

But for millions of Americans, malaria is something other people get somewhere else. The fact is that nearly half of the world's population is at risk for malaria. Residents of the United States are not immune. Malaria has occurred in the United States, and still does on rare occasions. Mosquitoes capable of carrying and transmitting malaria still inhabit most parts of this country. And an influx of malaria-infected persons has produced localized malaria transmission in some areas of the United States.

Today, however, the threat of developing *encephalitis* from

immune. Malaria has occurred in the United States, and still does on rare occasions. Mosquitoes capable of carrying and transmitting malaria still inhabit most parts of this country. And an influx of malaria-infected persons has produced localized malaria transmission in some areas of the United States.

Today, however, the threat of developing *encephalitis* from mosquitoes is far greater than the threat of malaria in the United States. Encephalitis, meningitis and other diseases can develop from the bites of mosquitoes infected with certain viruses. These include the viruses of West Nile, St. Louis encephalitis, LaCrosse (California) encephalitis, and Eastern equine and Western equine encephalitis.

CT Examiner

Waterford, Planning & Development

Developer Returns with Proposal for 47 Manufactured Homes, Neighbors Object Again

— Cate Hewitt, 1.27.2023

Residents and neighbors of Clark Lane in Waterford attended a Conservation Commission public hearing about a proposed development of 47 manufactured homes on Clark Lane. (CT Examiner)

WATERFORD – A year after a Norwich developer floated an 8-30g proposal to build 47 manufactured homes on Clark Lane, neighbors showed up at a public hearing to oppose the project a second time – again citing environmental, safety and density concerns.

Mark Branse, an attorney with Halloran Sage, who represented Kingstown Properties at the Conservation Commission hearing Thursday night, said the homes will be rentals and will include 14 affordable units – comprising 30% of the development under the state affordable housing statute.

The complex is slated for 8 acres that stretch behind a dozen houses that front Clark Lane just north of the town's middle school. The property consists of two parcels totalling 16 acres, of which six acres that abut Bates Woods Park in New London would go into a conservation easement. An area of wetlands on the property would be bordered by a 50-foot buffer.

During public comment, resident Nick Gauthier said the entire property "basically functions as wetlands," and "that should be enough to reject the project because of environmental concerns."

Gauthier asked why the project needed to be built on property that naturally provides an area for runoff during storms and floods, which he said will increase with climate change.

"Why does it have to be this specific area? There are already places around town that are paved over. It doesn't need to be this specific area that has benefit from an environmental perspective," he said.

Preceding public comment, David Held, a land surveyor with Provost and Rovero, who represented the applicant, said a large retention basin would be built for stormwater treatment with a hydrodynamic separator that had been "sized to remove 80 percent of the solids" since "a lot of pollutants adhere to solids."

"All impervious surface water will be captured and run through treatment... It's a belt and suspenders approach before discharging to the wetlands," he said, of controlling water traveling from Clark Lane to the middle school property as it flowed toward the areas of Fenger Brook and Jordan Brook.

"If we cut our development density in half, it wouldn't necessarily impact the size of the detention basin because we have to account for all water coming from outside of the site," Held said.

Plans showing 47 manufactured houses proposed at 131 and 109R Clark Lane in Waterford. (Town of Waterford)

Resident Sigrun Gadwa, who said she was a wetlands consultant and botanist, spoke in opposition to the project, especially about the impact on water quality in both Fenger and Jordan brooks.

"Fenger Brook has riparian wetlands, it's a network of rivulets and small streams that are groundwater fed and depend on shallow groundwater," she said. "I'm concerned that the stormwater management system is too large. It will handle all that water that went into the upland soils, joining groundwater, seeping toward the wetlands."

Gawda said that water will be redistributed – "drier on the upper part, wetter on the lower part" – resulting in significant tree mortality and adverse effects on the wetlands.

She also said the development's steep embankment "on the eastern edge of the trailer park development" will be an invitation for dumping – "it's scary for children, it's a safety issue."

Resident Christine Haase, a homeowner on Clark Lane, echoed Gawda's concerns about the steep embankment, and said the project would add 10-foot light poles that would run all night long, affecting neighboring nocturnal wildlife.

"The football-size detention basin, located directly next to the middle school" would have standing water, which she said was a potential breeding ground for mosquitoes, and that mosquito-related diseases had shut down school sports activities in Waterford for a number of seasons.

"Why should kids suffer for 47 units?" she asked.

Robert Roselund, a lifetime resident of Clark Lane, who objected to the density of the project, said "the houses will be five feet from my property, two feet from each other."

At one point town attorney Michael Perry interrupted the public comment and warned that "references to trailer parks and affordable housing not be made."

"It's irrelevant to the wetlands proceeding. Comments of this nature can be taken to be beyond the pale and potentially held against the town. There is no reason to be talking about trailer parks, or affordable or not affordable," he said.

Resident Arlene Sherman said the spreader mechanism in the retention basin had multiple flaws and would be "unable to polish the remaining pollutants." She said that the clearcut trees would be replaced only by shrubs, which will increase the heat in the summer.

"I'm aware that development is inevitable but the developer is attempting to put a square peg in a round hole. The wetland must be protected. There is not enough room for what he has in mind economically."

Residents Robert Roselund Jr., Elizabeth Carlson and Carolyn Yost spoke of the great loss of natural habitat the neighborhood would experience.

"If this is built, it would be a huge loss not only environmentally for my children and my children's children and everyone else's children who grow up on Clark Lane," said Roselund.

No one from the audience spoke in favor of the project.

The public hearing will be continued on Feb. 9.

Cate Hewitt

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The Columbus Dispatch

COLUMNS

Retention ponds remain magnets for kids, with sometimes deadly results | Theodore Decker

Theodore Decker
The Columbus Dispatch

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A few days after the body of a 4-year-old girl was pulled from a retention pond at a North Side apartment complex, tenant Lori King watched in horror from her balcony as a gaggle of small children inched closer to the same patch of water.

Fearing a tragic repeat so soon after the Sept. 2 death of Esther Mutivito, King swung her legs over her balcony railing, dropped five feet to the ground and ran shouting toward the pond at the Whispering Oaks complex. She shooed the children away, warning them that it was dangerous to play near the water.

She knows too well that her intervention, while effective in that moment, ultimately would prove futile. Two children narrowly escaped drowning after falling through the pond's ice in 2018, and a man drowned there in 2015.

People, especially children, are drawn to water.

"It's just going to keep happening," King said.

A week after Esther died, it did. But not at King's complex.

Tragedy struck another family on the following Friday, at another apartment complex on Columbus' East Side, where a

toddler tumbled into a retention pond and drowned. That pond has been the scene of multiple drownings through the years, of both children and adults.

And a few weeks before Esther died, on Monday, a 10-year-old Pataskala boy died after being pulled from a retention pond near his home. He and Esther had autism.

Retention ponds at apartment complexes often touted to renters

Despite recurring deaths at ponds like these, little ever seems to change.

The official line is that the ponds exist not for recreation but for stormwater management, and that the responsibility of being safe around them is an individual one.

Yet the owners of these residential developments often use the ponds to market the developments, suggesting how great it is living life along the water. So putting a fence around them would take away from the aesthetics.

The older ponds tend to be the worst. They were dug with steep sides to collect as much runoff in as small a footprint as possible, leaving more room for development. A few missteps, an awkward stumble, and a child might plunge from dry grass directly into water several feet deep.

Newer ponds have been built with more gradually sloping bottoms, but children drown in them just the same. While

many municipalities require pools to be enclosed, few demand that ponds be similarly secured. There are too many variables to make that feasible, officials say.

Usually, the deaths are chalked up to tragic accidents, and any blame is laid squarely at the feet of parents (or relatives or guardians who were in charge at the time). The message sent is clear: watch your kids and this won't happen.

And of course any good parent knows to watch their children. But as any honest parent knows, that is so much easier said than done.

Curious children are skilled magicians. They can disappear into thin air. And if the stars align in all the wrong ways, an absence of just a few minutes can spell disaster.

Retention pond tragedy: Fencing around pond could have saved daughter, man says

The child who died on Friday at Hartford on the Lake was the ninth person to die in that pond in as many years. Most of those victims died in cars when their drivers inadvertently drove into the water, which in some cases is mere feet from parking spaces.

Theodore Decker: Father, son latest to die at apartment complex pond

"People die and die and die," Iya Jilo told me in 2019, after one of these accidents claimed the lives of two of his relatives.

The mother of a child who drowned in the pond after falling through ice in 2013 sued the complex owners, but a judge ruled that it was her failure to supervise that led to the death.

The city later took the complex owners to remedy a long list of codes violations and other problems. Pond safety was not a priority.

But the complex was bought by new owners earlier this year, and a visit there on Tuesday revealed widespread and ongoing improvements to the apartment buildings and surrounding lots. The pond remains filled with trash, but brush around it has been cleared away and a landscaping crew was lining the banks with large rocks, from the start of the incline to the water's edge.

A similar rock border at Whispering Oaks, though, didn't save Esther.

As police and volunteers combed the neighborhood looking for her on Sept. 2, King encountered the girl's frantic mother near the pond. She told King that her daughter had wandered off and found her way to this pond before, even though they lived in another nearby complex.

She feared her child was in the water. King offered to wade the pond's shallows.

"I'm an old frog-giggin' lady and fisherman," she said. She walked through the water and shin-to-knee-deep mud that sucked at her boots, but found nothing.

The mother seemed relieved, but divers would find her daughter deeper in the same pond the next day.

"She was five feet from where I was at," King said.

"I'm not one to complain and not have a solution," she said. "Fill it in. Make it a dog park or a playground. That way it's another amenity. Call it Esther Park."

After the latest death at Hartford on the Lake, Tony Celebrezze, deputy director of the Columbus Building and Zoning Services Department, told The Dispatch that requiring safeguards for ponds would be costly and an uphill battle, politically speaking.

"Even if the City Council decided to pass something, it would be very difficult, maybe impossible, to do something retroactively," he said.

And right there is the sobering central fact in all this: the occasional death of a child in one of these ponds clearly isn't bad enough for business for these property owners to better prevent them.

Evidence of such a business decision can be found in another drowning that took place in a retention pond earlier this summer, up near Cleveland.

Two-year-old Alfred Hanover died on July 11, and the response to his death was almost immediate. Within two days, the property owner had started building a fence around the pond where Alfred died.

That drowning occurred at MGM Northfield Park, a popular casino and harness-racing track.

From that detail, you might have guessed that Alfred Hanover wasn't a child, or a person at all.

Alfred Hanover was a horse.

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Do Stormwater Retention Ponds Contribute to Mosquito Problems?

Issue Number: 71
Chapter Name: Technical Notes
Date: 05/2003

The following is an excerpt from the USEPA Nonpoint Source News and Notes Issue Number 71. The full document can be found at the USEPA website (http://www.epa.gov/owow/info/NewsNotes/).

Types of Ponds

Wet Ponds (Retention ponds)

Wet ponds are storm water control structures that provide both retention and treatment of contaminated storm water runoff. A wet pond consists of a permanent pool of water into which stormwater runoff is directed. Runoff from each rain event is detained and treated in the pond until it is displaced by runoff from the next storm. By capturing and retaining runoff during storm events, wet detention ponds control both storm water quantity and quality.

Dry Ponds (Detention ponds)

A dry pond is designed to capture and slowly release runoff water for a period of 72 hours or less after a precipitation event. Dry ponds do not treat the storm water and are typically constructed in areas where flood control is the greatest concern.

Mosquito Control

Discussion of mosquito control in guidance manuals written to date has been sparse, although that should not imply that mosquito control is not being addressed. Properly designed, operated, and maintained ponds are not conducive to standing water and as such should not be fertile breeding grounds for mosquitoes. To help control mosquitoes in their wet ponds, some localities introduce mosquito predators such as mosquito fish.

Mosquito breeding potential depends on the depth and location of the standing water. To prevent proliferation of mosquitoes in wet ponds, guidance manuals often contain recommendations for minimum pool depths and the establishment of habitats that promote colonization of the facility by mosquito predators both aquatic and terrestrial (e.g., dragonflies and mosquito fish). Improperly maintained dry ponds, however, may contribute to mosquito problems. In cases where the dry ponds are improperly designed or maintained and do not drain within 72 hours after a precipitation event, increased mosquito populations have been observed.

The Florida Cooperative Extension Service reported in *Mosquitoes Associated with Stormwater Detention/ Retention Areas*, one of a series of fact sheets by the University of Florida's Entomology and Nematology Department (http://edis.ifas.ufl.edu/mg338), that properly functioning, extended detention wet ponds are not a significant mosquito problem, but that dry pond systems holding standing water as a result of improper design, construction, or maintenance (or neglect) are a problem. As a result, Florida requires these dry ponds to be designed to drain within 72 hours to prevent the creation of mosquito habitat.

SECTION I - TITLE, AUTHORITY AND PURPOSE

1.1 These regulations shall be known as "The Inland Wetlands and Watercourses Regulations of the Town of Waterford".

1.2 The Conservation Commission of the Town of Waterford was established in accordance with Chapter 2.52, of the Waterford Code of Ordinances adopted on April 2, 1973,and Chapter 5.3 of the Charter of the Town of Waterford as revised to December 8, 1983 and authorized to implement the purposes and provisions of the Inland Wetlands and Watercourses Act in the Town of Waterford pursuant to Chapter 2.52 of the Waterford Code of Ordinances.

1.3 These Regulations have been adopted by the Conservation Commission and may be amended, from time to time, in accordance with the provisions of the Inland Wetlands and Watercourses Act, Section 22a-36 to 22a-45, inclusive, of the Connecticut General Statutes as authorized by the Representative Town Meeting of the Town of Waterford in Chapter 2.52 of the Waterford Code of Ordinances.

1.4 The Inland Wetlands and Watercourses of the State of Connecticut are an indispensable and irreplaceable but fragile natural resource with which the citizens of the State have been endowed. The wetlands and watercourses are an interrelated web of nature essential to an adequate supply of surface and underground water; to hydrological stability and control of flooding and erosion; to the recharging and purification of the groundwater; and to the existence of many forms of animal, aquatic and plant life. Many inland wetland and watercourses have been destroyed or are in danger of destruction because of unregulated use by reason of the deposition, filling or removal of material, the diversion or obstruction of water flow, the erection of structures and other uses, all of which have despoiled, polluted and eliminated wetlands and watercourses. Such unregulated activity has had, and will continue to have, a significant, adverse impact on the environment and ecology of the State of Connecticut and has and will continue to imperil the quality of the environment thus adversely affecting the ecological, scenic, historic and recreational values and benefits of the state for its citizens now and forever more.

The preservation and protection of the wetlands and watercourses from random, unnecessary, undesirable and unregulated uses, disturbance or destruction is in the public interest and is essential to the health, welfare and safety of the citizens of the state. It is, therefore, the purpose of these regulations to protect the citizens of the state by making provisions for the protection, preservation, maintenance and use of the inland wetlands and watercourses by minimizing their disturbance and pollution; maintaining and improving water quality in accordance with the highest standards set by federal, State or local authority; preventing damage from erosion, turbidity or siltation; preventing loss of fish and other beneficial aquatic organisms, wildlife and vegetation and the destruction of the natural habitats thereof; deterring and inhibiting the danger of flood and pollution; protecting the quality of wetlands and watercourses for their conservation, economic, aesthetic, recreational and other public and private

uses and values; and protecting the State's potable fresh water supplies from the dangers of drought, overdraft, pollution, misuse and mismanagement by providing an orderly process to balance the need for the economic growth of the state and the use of its land with the need to protect its environment and ecology in order to forever guarantee to the people of the state, the safety of such natural resources for their benefit and enjoyment and for the benefit and enjoyment of generations yet unborn.

1.5 The Commission shall enforce all provisions of the Inland Wetlands and Watercourses Act and shall issue, issue with terms, conditions, limitations or modifications, or deny permits for all regulated activities in the Town of Waterford pursuant to Sections 22a-36 to 22a-45, inclusive, of the Connecticut General Statutes, as amended.

Chapter 7 - Health issues related to drainage water management

Martin S. Fritsch
Swiss Federal Institute of Technology, Zurich, Switzerland

The interactions between drainage, water management and health

Proper surface and subsurface drainage to remove excess water in a safe and timely manner plays an important role in controlling water related diseases. Careful control and appropriate reuse of drainage water can help protect the environment and optimize the use of water resources.

The health issues related to drainage water management can be grouped in three categories:

i. water related vector-borne diseases;
ii. faecal/orally transmitted diseases; and
iii. chronic health issues related to exposure to residues of agrochemicals.

In tropical and subtropical regions there is a close link between the presence of excess water (due to lack of adequate drainage) and the transmission of water related vector-borne diseases. Malaria, schistosomiasis (bilharziasis) and lymphatic filariasis are important water related vector-borne diseases. Despite control programmes, health services and available treatments, these diseases today represent a growing health problem.

Water related vector-borne diseases are caused by bacteria, viruses and parasites (protozoa and helminths) transmitted by water related disease transmitting agents, also called vectors or intermediate hosts. A vector is an animal, often an insect, that transmits an infection from one person to another person or from infected animals to humans (Cairncross and Feachem, 1983). Most infections can only be transmitted by a particular, disease-specific vector, e.g., malaria by *Anopheles* mosquitoes. An intermediate host has a similar role to a vector. However, such an organism does not actively transmit a pathogen, like freshwater snails in the case of schistosomiasis. Vectors and intermediate hosts represent critical elements in various disease transmission cycles of parasitic water related diseases. In general, they live in or near aquatic environments.

Direct pathogen transfer and the transmission by vectors and intermediate hosts require specific environmental and socio-economic conditions. The conditions are defined by:

i. quality and quantity of water;
ii. type and frequency of human-water contacts;
iii. number and distribution of vector or intermediate host breeding sites; and
iv. exposure of humans to vector and intermediate host populations.

Consequently, *the* above-mentioned diseases can also be associated either directly or indirectly with the design and management of treatment and disposal plants for the re-use,

treatment or disposal of drainage water. The key criteria for such a health risk are:

i. introduction of temporary or permanent open water surfaces bodies, e.g., constructed wetland, stabilization ponds, or evaporation ponds;

ii. suitability of such water for vector breeding;

iii. accessibility for the local population;

iv. location in relation to human settlements and transport links (e.g., roads); and

v. pollution by organic or inorganic substances.

Misuse and lack of maintenance are the two main reasons why drainage structures (road drainage ditches, culverts, dam site drainage or drainage canals in irrigation schemes, and also drainage water treatment and disposal facilities) are often associated with environmental health problems. Farmers, associations or national agencies generally conduct regular maintenance on irrigation canals. Water quality and flow velocity are relatively high. However, in drainage facilities the opposite conditions are frequent. Silting, uncontrolled aquatic weed growth, slow water flow or stagnant pools associated with the resulting wetlands offer ideal breeding conditions for mosquitoes and aquatic snails. Farmers seem to concentrate on irrigation water management rather than on drainage management.

Moreover, there is often a lack of adequate domestic water supplies and sanitation facilities. Thus, drainage canals or drainage water treatment and disposal facilities are often misused for washing, drinking and uncontrolled disposal of human excreta or other waste by the poorest and, thus, most vulnerable social groups. In this way, drainage water contributes to disease transmission.

Water related diseases and their vectors

Vector-borne diseases: transmission by insects

Insect vectors represent the largest group of disease transmitting agents. In most cases and for the most widespread diseases, mosquitoes are the main vectors. Among a wide range of vector-borne diseases, two diseases, namely, malaria and lymphatic filariasis stand out as serious health hazards in the context of poor drainage.

Malaria

Malaria is caused by a protozoan parasite of the genus *Plasmodium.* Malaria is a complex disease causing fever, anaemia and an enlargement of the spleen. This causes additional cerebral complications, especially for children. Correspondingly, child mortality rates for *P. falciparum,* one of the four types of malaria affecting humans, are very high with approximately one million children below the age of five dying in 1993 (WHO, 1995; WHO, 1996).

Malaria is transmitted by the bite of a mosquito of the genus *Anopheles.* The transmission cycle is only between man and mosquitoes. Man acts as the intermediate host or reservoir and the mosquitoes as the vector. Protozoan parasites of the genus *Plasmodium* have to undergo complex development and multiplication processes both in man and mosquito before they can be further transmitted. Only the female mosquitoes are of importance for transmission, as they need a blood meal for oviposition.

Malaria covers not only all developing countries, but is present on almost the entire land surface between the latitudes 40°N and 60°S. However, the distribution is not uniform and depends mainly on climate, altitude, population density and the specific environmental requirements of the mosquitoes species.

Highly endemic areas are sub-Saharan Africa, Central America and the northern part of South America, the Indian subcontinent and Southeast Asia.

In the last two decades, a growing number of malaria cases have been observed (WHO, 1996). However, this cannot only be explained by the increasing population. To a large extent, this is also due to the increasing number of WRDPs such as irrigation and drainage schemes or hydro-electric dams. With the introduction of new open water surfaces in the form of canals, ponds and artificial lakes, new mosquito breeding sites have been created.

However, the persistence of the disease is also due to the absence of effective long-lasting vaccines, and the growing resistance of malaria pathogens and mosquitoes to treatment and insecticides, respectively. By the end of 1985, 50 of the 150 potential malaria transmitting *Anopheles* species were already recorded to be resistant to one or more pesticides (including DDT). At least 11 of those 50 species are known to be important and dangerous malaria transmitters (WHO, 1989).

Furthermore, malaria transmission is not only related to WRDPs. Deforestation, mining, road construction and all the negative consequences of rapid and uncontrolled urbanization are also contributing to the creation of mosquito breeding sites. In this context, urban drainage plays two key roles. On the one hand, it is an essential and effective tool for reducing and eliminating mosquito breeding sites by controlling surface water and waterlogging and by eliminating unnecessary open water surfaces. However, on the other hand poorly maintained drainage canals can represent potential breeding sites for various mosquito species if they are permanently flooded and aquatic weeds are not cleared.

Finally, a fresh risk might result from climatic change. First reports suggest that global warming can change the geographical distribution of mosquito breeding and shift the malaria transmission border line to the north (WHO, 1996).

Lymphatic filariasis

coli diarrhoea or salmonellosis, enteric fevers such as typhoid.

iii. Soil transmitted helminths: Eggs of parasitic worms are expelled in faeces and require a development stage in moist soils. They reach the human host either by being ingested on vegetables or by penetrating the soles of the feet. Transmission takes place in communal defecation areas or around dirty latrines without clean concrete floors. Examples: ascariasis, trichuriasis, hookworm.

iv. Beef and pork tapeworms: Transmission cycle includes an intermediate development stage in an animal and infection of man occurs when the meat is eaten without sufficient cooking. Transmission can be triggered through the application of sewage sludge as fertilizer on grazing land. Examples: taeniasis.

v. Water-based helminths: The most typical example is that presented above in the section on schistosomiasis. As indicated, eggs in faeces must reach water in order to undergo the next development stage in an aquatic snail. The guinea worm (fasciolopsiasis) follows a similar cycle.

vi. Excreta related insect vectors: Filariasis transmitting *Culex* mosquitoes prefer to breed in highly polluted water. Badly maintained, unventilated latrines or uncovered septic tanks offer the best breeding conditions, mainly in urban areas. However, filariasis may also reach man simply by being carried by flies or cockroaches.

An important characteristic is the persistence of a specific pathogen, i.e., its ability to survive in the environment and whether animals, either in series or parallel, are part of the transmission cycle in view of the above classification, water quality and the environmental conditions around water

i. Intermittent drying out of ponds or storage tanks for at least 5-7 days.

ii. If possible, lining of all facilities to avoid seepage and minimize aquatic growth. In the case of earth lining: regular weed control. Only restricted or no applications of insecticides or molluscicides.

iii. Restricted accessibility in order to reduce man-water contacts.

iv. Settlement planning: geographical separation of settlements from ponds and tanks.

v. Monitoring of vector breeding activities and water quality.

vi. Evaluation of options.

Constructed wetlands

The various physical, chemical and biological treatment processes may require a number of water retention structures such as constructed wetlands. This could lead to new and mostly permanent open water surfaces. Here again, the question is whether vector breeding sites will be created, or whether the purification capacity will determine the effluent quality and thus the water quality for low-end consumers.

Questions:

i. How many new and permanent water bodies will be created? How large is the area?

ii. What kind of vegetation (e.g., aquatic weed) will grow?

iii. Is the local population already exposed to water related diseases? Where are the transmission foci located? What vector or intermediate host species are involved?

freshwater (e.g., groundwater), which will then be used for drinking?

Control and prevention:

In the case of direct re-use, there are few opportunities for the application of environmental management measures. Once drainage water has entered an irrigation system, it is probable that individuals will come into contact with this water. Therefore, effective monitoring of the quality standards of drainage effluents is most important. It is necessary to develop safeguard strategies in case of unacceptable or dangerous contamination levels.

Agriculture-forestry system and solar evaporators

This system of drainage water management, which aims at a continuous concentration of salt in progressively smaller volumes of water, is less of a health risk, as saline water is unsuitable for drinking. Here, the question is whether this series of irrigation systems will create new open water surfaces for vector breeding.

Questions:

i. Does the system create new and permanent open water surfaces (e.g., solar evaporator)?

ii. If so, can they serve as breeding sites for mosquitoes? Do mosquitoes already breed in the area and to what extent are mosquito transmitted diseases prevalent? Are there mosquito species involved which can breed in brackish water (e.g., some *Aedes, Culex* and *Anopheles* species)? Can water snails tolerate the salt concentrations?

iii. Can aquatic weeds grow?

iv. How near are settlements, roads or larger urban centres? What diseases are prevalent there?

Control and prevention:

iv. Do their breeding requirements correspond to the environmental conditions created by a constructed wetland (e.g., for mosquitoes)?

v. How near are settlements, urban centres and roads? Are there any migration movements in the areas?

vi. What is the quality and performance of the local health service? What is the perception of the population regarding environmental health issues?

vii. Are there any data on prevalence, incidence, vector population dynamics or breeding habitats?

Control and prevention:

i. Water level fluctuations and intermittent drying out of the wetland area.

ii. Restricted accessibility.

iii. Geographical location outside and separated from human settlements.

iv. Off site: settlement planning and maintenance, housing improvement, personal protection.

v. Health education.

vi. Monitoring: vector populations, water quality, case reporting.

vii. In the case of high community vulnerability and environmental receptivity: evaluation of options.

Environmental management measures applied to drainage structures

Drainage systems need to be connected either with subsurface or surface drainage canal outlets. In the case of surface collector canals, additional open water surfaces will be introduced. In warm and hot climatic zones, drainage

canals include a number of typical features which favour vector breeding, disease transmission and direct pathogen propagation, such as low and irregular flow velocities, low embankment slopes, high seepage, uncontrolled water access, uncontrolled deposition of excreta and aquatic weed growth.

Environmental modification

Modifications to the drainage system environment would include: the change from open to piped or covered drains; canal lining with concrete in order to increase flow velocities and reduce aquatic weed growth; installation of special structures for cattle crossings and drinking; and boat ramps to protect earth embankments.

Environmental manipulation

The key elements of environmental manipulation would be flow and water level management measures. Periodical flushing will help to dislodge snails and mosquito larvae if drag forces or shear stresses due to higher velocities exceed certain limits (Jobin, 1987; Oomen *et al.*, 1990; Fritsch, 1993). Water level fluctuations can have distinct control impacts on both snail and mosquito breeding. If the drop is fast enough, snails, larvae and eggs become stranded and die (Fritsch, 1993). Intermittent flow, drying out of canals in connection with flushing, and water table fluctuations can also be effective tools to control mosquito or snail breeding. However, the approach differs for snails and mosquitoes, according to the locally specific population dynamic and vector bionomics (Oomen *et al.*, 1990). Finally, canal maintenance means weed control and the removal of sediments. Weed control can be done either mechanically, chemically by applying herbicides, or biologically with fish.

Modification and manipulation of human habitation or behaviour

Interventions and environmental changes related to human habitation might not be sufficient if canals are continuously

misused for excreta and waste disposal. In this case, health risks have to be minimized with a set of non-drainage related measures. This includes the improvement of sanitation facilities and personal hygiene (e.g., water supply systems or latrines) and the planning and maintenance of settlements.

Development of control strategies

There are no standard packages of engineering techniques available, nor should environmental management be considered as the ultimate solution for controlling water related parasitic diseases (Fritsch, 1993).

Birley (1995) has introduced a systematic approach to forecast vector-borne disease implications. In this assessment methodology he addresses three main components which contribute to the potential health hazards:

Community vulnerability: This describes the prevalence of specific diseases in social groups such as children, adults, males, females, workers or farmers. The prevalence is brought into relation with the proximity of disease foci, the immune status, previous history of exposure, general health status and the role of migrants. Vulnerability is ranked as high, moderate or low.

Environmental receptivity: This is the receptivity to transmission of the pathogen related to the abundance of the vector, to human contacts with water or vectors and to any other ecological or climatic factors favourable for transmission. The assessment is followed according to possible transmission but not to occurrence, transmission easily resumed, or to high receptivity.

Vigilance of the health services: This describes the quality and performance required of a health service to cope with an increased health hazard. The question is whether a health service is able to support and manage vaccination campaigns, continuous case detection, drug provision and

delivery, hospitals, sufficient and skilled staff, health education and information or means for chemical or biological vector control. The ranking includes: very good, effective preventive measures only, effective treatment only, and none.

The assessment of control strategy effectiveness is organized in a sequence of flow charts and worksheets. It includes a comprehensive set of questions which finally lead to the ranking of the three components. The methodological approach forces one to focus on control elements and will structure data and help to set up additional survey or monitoring concepts if there is a lack of data. It will also help in assessing the quality and reliability of data. Overall the final outcome (the total assessment of potential health hazards) will provide a sound basis for identifying the required set of safeguards and preventive intervention measures, including the environmental engineering required to control water management related diseases.

I have run a landscape company for 40 years. We have worked with large retail companies apartment complexes, Municapalities, state and federal goverment.

I am very familier with retention ponds and there complicated systems that need life time moditering and maintenance. Even at best they do not come close to a natural ecosystem. They are prone to failure and are dangerous to children. With out proper maintenance the consequences can be flooding not only the development but also neighboring buildings. They can become a breeding ground for Misquaits which carry a host of deseases, encephalitis, west Niles virus, yellow fever and more. This developer wants to place a retention pond next to Clark Lane middle school where currently 581 of our children attend school and every Waterford child will some day attend. Not to mention The pollutants that will migrate to Our wet lands.

The woodland area where the developer plans to clear cut 10 acres of trees I have walked through and know like the back of my hand. It is dotted with small streams and brooks that flow into the wet lands. They are litterly an important part of the wet lands

Lets be honest here. This project is not about a handful of affordable units but about profit for the developer. The developer is using a state law that was ment for good to bully the town and residents of waterford and destroy a natural resource that does not belong to us or him but to our children and their children.

Are we willing to destroy this pristine ecosystem for a few afordable housing units that could be built in a number in already developed areas. Risk flooding of the already established middle school and homes and worse of all risk the lives and health of the 581 children who attend clark lane middle school. Even the chance that a misquote breeding ground could be established beside our middle school exposing our children to misquote born illnesses from encephalitis. west Niles virus, yellow fever and more. for the developers pocket book.

CAN WE TRUST A developer driven by PROFIT

Retention Ponds: Attractions or Liabilities?

Many churches use retention ponds to control storm water runoff on their property. These ponds can enhance a church's aesthetic value, but they can also create liability and maintenance issues. Here are some of the problems associated with retention ponds, along with some risk management tips.

Risk #1: Drowning

Children are attracted to water, and retention ponds offer ready access. Unlike swimming pools, these basins typically aren't fenced in.

They can also be deep and have a steep drop off at the water's edge, since they're designed for maximum rainwater collection. Muddy bottoms and slippery sides can make it difficult for someone to escape.

Risk #2: Mosquitoes

Since mosquitoes breed in any still water they can find, your retention ponds can become a nuisance to residential neighbors. The solution lies in preventing mosquitoes from breeding, either by breaking up the surface of the water or eliminating mosquito larvae.

people, pets, plants, and fish but effectively eradicate mosquito larvae without harmful chemicals.

Risk #3: Algae

In general, algae are essential for a healthy pond. However, these small aquatic plants can pose a problem when you have too much of it. An algae bloom can reduce the oxygen available to support fish and other plant life within the pond. It's also unattractive to see a pond covered with green scum.

Algae problems usually occur due to ponds being neglected. While retention ponds require minimal maintenance, you can't usually "dig a hole" and then let the pond take care of itself. Healthy ponds require proper aeration, integrated pesticide management, and adequate pond weed control.