

Mayne Island Integrated Water Systems Society

6th Annual Southern Gulf Islands Water Workshop Your Septic System: The Other End of the Water Business

Saturday, May 1, 2010

Attendance: 113

Summary of Presentations

Speaker	Discussion
Mary Cooper, President and Program Director, MIWSS	<p>Presentation: Mary Cooper, President & Program Director, Mayne Island Integrated Water Systems Society:</p> <ul style="list-style-type: none">- MIWSS, appreciation and activities- Septic System Workshop goals <p>Welcome to the 6th Annual Southern Gulf Islands Water Workshop: Your Septic System: The Other end of the Water Business</p> <p>As in the past 5 workshops, our communities continue to enjoy a day of quality and educational speakers on important topics ---and do it with low registration fees----- only because we have excellent financial supporters.</p> <p>We once again thank our SGI-CRD Director Ken Hancock for his continued generous financial backing and moral support for our work on water issues, and to that we add the consistent backing of Local Trust committees from Mayne, South Pender, North Pender, Galiano, and Saturna Islands.</p> <p>We thank the Lions Club for continuing to provide us with tables and comfortable chairs. You all had contact with Al Maxwell through registrations. Thank you Al for a job well done and to the many invaluable hands that go into making the workshops a success including the ladies of Mayne who bake muffins for our early risers.</p>

Speaker

Discussion

I would like to publicly acknowledge my executive Ev, Diane, Marie and Bill. There is ALWAYS something cooking with MIWSS. Thanks folks for your patience and sense of humour. This is a great team.

Hang on to your agendas as it has your draw ticket for some lovely prizes donated by our exhibitors and island businesses. We are a bottled water-free zone. As much as we can make it, everything we use is recyclable.

We have 2 changes in our agenda . Wayne Lee of Aqion Technologies was unable to attend, and Bob Davey of Advanced Environmental offered to present. Kerry Anne Sheehan of UV Pure brings us a Hallet UV presentation.

For the small water system operators, please complete your CEU forms. I will send them in bulk to the EOCP and follow up on their arrival as usual, and keep you posted.

For the wastewater practitioners, Ron will explain the wastewater equivalent to the small water systems operator's EOCP. If you require a letter of attendance from us or a report for credits, we will be happy to accommodate.

We have 2 brand new certified all water system operators with us today: Wesley Mulvin from Mayne, John Gahn from Saturna, and to both, we offer our congratulations.

We sponsored 1 operator last year for the 2-day course and exam and are planning to sponsor one more this year in order to keep a supply of qualified people available for our island water systems. Sponsoring means an expenditure of close to \$700.

I urge you support us with a renewal of your MIWSS membership or to join today while it is so convenient. What you see today is only one very small part of our work for all the islands, even though we are based on Mayne. It is a reasonable \$5, and we'd love to have you aboard. We all know numbers talk when it comes to government recognition.

One of the benefits of membership is our reduced pricing for Caroma dual flush toilets and showerheads, as offered by Wolseley in Victoria. The generous offer made to our membership is the same price we are getting for the school toilet replacement project. The toilets must be installed on island and you must be a member of Integrated. We ask only that in return, you enjoy their generosity and desire to work with us towards conservation on the islands, and not abuse their offer by installing the toilets anywhere but your island home----or we could risk having the offer withdrawn.

Speaker

Discussion

MIWSS: When I read about water disasters, not only in other countries, but in Canada, I can't believe what is happening. How can North Americans, in a so called educated society, possibly be so short sighted as to run a river dry?

As Islanders, we do what we can locally, and try to force our expectations far enough up the ladder to force the bigger changes.

As most of you know, we have been fund raising for new toilets for our school. We are happy to report that we are able to replace all 10 toilets and 2 urinats with more water efficient Caroma dual flush toilets, and that the school maintenance people will be installing the new infrastructure this summer. We appreciate the very prompt generosity of the many Islanders, organizations and businesses on Mayne, and on the list we have posted, I would like you to note the inclusion of Salt Spring Islander John Wiebe and the Pender Island Conservancy through Sylvia Pincott.

After 4 years of one way discussions about this upgrade, and with the ongoing cutbacks, we felt this project had to be taken in hand. When islanders want something to happen, we make it happen. This success is yours. Thank you.

Our AGM is Sunday, June 6, 1:30p.m. at the Community Center. We have 3 director positions open, and 2 standing, so if you are interested in YOUR water, we would love to have you. This water business is interesting, diversified, and always something new. Integrated Water is limited only by our person power and our finances. We have lots of ideas.

Saturday, October 16 at the Ag Hall will be our full day fall technical workshop, starting off with water chemistry with Bill Warning. We are considering 'back flow preventers' (BFPs) as the afternoon topic. While we program this fall workshop mainly for the benefit of small water systems operators, their certification maintenance, and the education of water board trustees, all of our workshops are open to everyone who has an interest. It will be "at cost", and as affordable as we can make it.

We will again be at the Mayne Island Fall Fair with one on one consultants, and hope to again make the Pender Island Stewardship day.

Lobbying: How many years we have been battling for recognition of hydrofracturing of water wells with the legislative framework? We are still battling. The paper was submitted to the now defunct Water Advisory Panel for Phase 2, which was also cancelled. We were encouraged to re-submit the paper to the Water Act Modernization committee and this we have done.

We also submitted our concerns surrounding the lack of backflow prevention requirements for the now legal purple pipe installation

Speaker

Discussion

program. Our concerns address the lack of a simple piece of economical equipment, within the legislation, as a requirement that would prevent water system contamination from a non potable water source, once that water has been introduced into the home for a toilet supply. (i.e., a rainwater collection tank or a pond).

With the purple pipes source supply from rainwater, the set up will work fine until the home owner has depleted his source midway through a drought, and/or with a houseful of citified relatives. To keep the frazzled hostess at bay, he cross connects to the community water system with a simple tee. If contamination occurs, it will take extreme measures to find the source, purify the system, while everyone suffers through a boil water order, not to mention the cost of testing water at all homes until they locate the offending home.

Cross connections are illegal, but they commonly occur and are not generally regarded as serious enough for water systems to take action, since the alternate source is often a private well. With purple pipes, that outlook may have to change. Good careful water systems should have testable BFPs on every connection, separate from any homeowner requirements for BFPs, and have an ongoing BFP maintenance program.

I think the thing that alarmed me the most, was that in assorted discussions with someone in the Ministry, it was said that was covered in the building code, not to worry, it would all be inspected prior to an occupancy permit being issued. Cross connections would not pass. The Ministry is out of touch with island homeowners --- we fix things our way AFTER the building inspector leaves.

He could not see that this was a health issue and insisted that VIHA, in our case, had nothing to do with building inspection. He missed the fact that VIHA has everything to do with the contamination of a community water system caused by a cross connection to a non potable water source.

Water is spread over many Ministries. Each has a set of blinders about what falls within the parameters of the other Ministry, and sometimes miss the peripheral dangers of inaction or lack of cross Ministry consultations.

The Islands Trust: At our Trust level, we have asked that they study requiring water be purveyed through a community systems as opposed to individual wells when approving subdivisions. This is long term goal, and needs broader developing for presentation at the higher levels.

We had the delightful opportunity to speak at the AGM for the North Galiano Community Hall. No matter which island you visit, the concerns are the same and we appreciated the opportunity to connect about water. Beautiful island and a great day.

Speaker

Discussion

We attended the 2 day Water Act Modernization conference at Nanaimo, one of 12 across the province. It was extremely interesting, interactive, but the proof is in the pudding. The results will be increasing groundwater regulation with a goal of matching the current surface water regulations. The Gulf Island and the Okanagan Valley will likely acquire "special" designation, enabling local legislation for our unique water situation. Undoubtedly this will also include cost downloads.

Our webpage: We probably put more time and effort into the webpage on an ongoing basis than any other project.

If you want to compare water taxes and tolls with other systems, check out the member systems page. Links to governments, resources, business page for your supplier information, and much more.

If you are interested in library books about water, local or world wide, technical books like Dr Diana Allen's book on the Gulf Islands or how-to books, they are listed on the site with a short report. If you find a good book on water, let us know and we will get it for the library. We are also working to include Saturna, Pender and Galiano libraries on these listings.

We've heard the site is pretty well regarded as a source of info on island water. Mayneisland.com/water.

Our membership stands at 27 water systems from Mayne, Galiano, Pender, Saturna, Salt Spring and Vancouver Island. We have about 115 individual members, plus businesses and societies. The annual membership fee is \$5 and if we intend to be successful in pushing our concerns forward, we need to prove community support. That means we need you. 6 years ago our total membership was 5 water systems.

We are in the Mayneliner, Pender Post, Saturna Scribbler and Galiano Active page on a monthly basis. We watch the Trust for water issues. We make sure our members are up to date on water issues on all islands simply because we are all in the same bind, long droughts, lowering water tables, increasing populations and tons of tourists---when it is the driest of course. We need to help one another.

UPCOMING:

In the development stage is an all island water council which will work to find areas of common concern and focus on a broad solution. For Islands like Cortes and Galiano, water centric groups are evolving from OCP review committees. Saturna Water

Speaker

Discussion

Council is more active because of the East Point problem.

One interesting event that happened on Salt Spring, was that the Beddis water system was informed by the CRD that they had 2 choices, increase their water consumption, or face increased water rates. This stemmed from folks caring enough to be serious about conservation. The odd part about this is that over the years, I have had several discussions with a former CRD employee about we folks who use the flat tax and that the toll method of charging for our water is misguided. He advocated, as a lot of proponents do, that the only way to go was to charge by consumption based meterage.

The problem with solely meter based rates is the insecurity of the reliable income that is offered by the tax and toll method. I am not above saying I told you so, but that doesn't help Beddis, nor the folks in Victoria, where the CRD did the same thing as well as cancelling the \$75 low flush toilet rebate.

Now to something important that is on the increase and that should be of concern to every islander – salt water intrusion.

I can guarantee you that no one wants to openly stand up and admit we have a problem, but the head in the sand approach to any problem is delusional. This isn't going to go away.

Integrated Water needs the co-operation of all water systems and well owners for an across island salt water intrusion assessment to find out just how much of, or even if, we have a problem. We know areas where it is increasing over the years and we know of areas where it is seasonal. What we do not know is how far inland the intrusion is, and over time, is it stable or increasing. We need the sphere of influence for the peripheral wells. This assessment has to be done so we can start a base of information. This must be fully inclusive of water systems and individual well owners alike.

If one well goes saline, it is the canary in the mine for the well next door.

It will be the slow increase that must be monitored to detect a trend. Last workshop, we talked about the 11 desal units on Lopez, and that the State has refused permits for more installations. Lopez Island is our next door neighbour.

Last year we learned about the disastrous situation at East Point on Saturna Island where wells were lost to intrusion because of over draw by one party. One well has come back, but the homeowners are not sufficiently confident of its reliability and are converting to rainwater collection.

Speaker

Discussion

We have the instrumentation on island for the very simple test, and now we need the participants. What we learn will be generalized by area and not specified by property description, nothing will be made public concerning any property without the owner's written consent, and there are no strings, and best yet, no costs. We can locate your well for you by GPS if you like as well. Bill Warning will happily talk with you about the assessment project.

Speaking of rainwater collection, I want to remind you that Premier tanks is offering a 10% factory discount on tanks through this workshop and purchased through your local dealer.

I trust that the well owners brought in their water samples today for the MB Lab discount.

Now to the workshop:

Take a look around you. Look at that lovely body sitting next to you. You are probably looking at the most perfect intricate recycling machine ever concocted--- the human body. It absorbs the necessities of life, extracts and processes bodily needs.

We may not be happy with the gift wrapping, but we can't deny the efficiency of the infrastructure. Trouble is we are not emission free.


So----as water does not start at the tap, septic do not end with the flush and citified thinking will never make an island survivor.

The topic today touches upon a vital issue for islanders that live within 2 very restricting parameters: groundwater and septic systems.

For water workshops, we like to think of the purity of water in food product terms. But we cannot live on an island for a hundred years, putting our wastes into the ground, drawing our drinking water from that ground, and then not expect, at some point, to find that the two have become friends.

Septics are not something we go out and hug every morning, but when your septic system feels abused, it most certainly knows how to get your attention.

It is a confusing topic for the homeowner, and it was a confusing topic when I started organizing this workshop. We have tried to approach it from all angles: why do we care if it is now working fine, how do we maintain, how do we find the septic field, why is this not a "must test" requirement for property re-sales, and why is "subject to" rarely found in offers to purchase. Who do we turn to, and are they right for my situation, what am I ALLOWED to do, where do I go when I am at my wits end. AND MOST

Speaker	Discussion
	<p>IMPORTANTLY, who can I trust!</p> <p>We are going to talk about interface, about the old systems and how we can nurse them into a longer life. We are going to introduce you to the new trend in wastewater treatment. We need to ask who is making sure you get what you are paying for, and for those of us who have looked to VIHA for oversight and protection over the years, we need to know where they currently stand in all of this.</p> <p>And finally we are going to talk with someone who is speaking from the school of hard knocks---a new wastewater system owner.</p> <p>Because of the "deer in the headlights" feeling that surrounds this topic, for the first time I am going to offer a disclaimer. Most of the presenters and exhibitors are in the business. Whether they meet your needs and pocket books is your decision, so make sure you are comfortable with it. We are not recommending one style or practitioner over another. Integrated Water is simply acting as an information facilitator in an attempt to give you a starting point, and enable an educated decision on your part.</p> <p>The success of this day depends primarily on you. The more questions you ask, the more you will learn .if you are hand warmers, all you will hear is what is presented. There is so much more info out there. This workshop is intended to be interactive, and we hopefully will learn as much from the questions and responses as we will from the presentations. So try to get your money's worth!</p> <p>Our first presenter: Rosemary Bennett</p>
Rose Bennett	<p>Rose Bennett's presentation is attached.</p> <div data-bbox="1027 1375 1149 1585" style="text-align: center;">  <p>Septic Field Presentation May 201</p> </div>
Dr. Azit Majumder, NSERC Senior Research Chair and Professor, Water and Watershed of Ecology,	<p>Globally, water contaminated with pathogens, chemicals and waste kills more people than anything else. Culturally, Bangladeshis are used to dealing with only decomposable materials and because so many plastic bags have found their way into waterways their use has been banned in that country. We should remember that every watercourse is someone else's drinking water. In Canada on any given day 1000 to 1200 communities are on a Boil Water Advisory.</p>

Speaker

Discussion

University of Victoria,
on "Challenges of
Sustaining Quality
Groundwater and
Surface Water under
Changing Climate and
Land Use Scenarios"

90% of the water systems in BC are unfiltered and chlorinated; this could be why BC has the highest rate of enteric illness in Canada.
We need to manage our water, not treat it. Management is less expensive and is not a liability to economic growth.
In cottage country lakes it is shown that septic systems do not remove phosphorus – this promotes algae which forms toxins.
Algae toxins are evident in animals that are high in the food chain.
The presence of enriched nitrogen and caffeine in lakes indicate fecal contamination and human originated bacteria.
Bacteria from septic fields and other activity is found in aquifers. It seeps in through cracks in the ground.
Safe water does not mean healthy water. We must sustain our water for our health, and not through disinfection.

Q Can tropical parasites from travelers be introduced into our water?

A It is unlikely due to the temperature that the tropical parasites would need to survive.

Q Will the bacteria in a sand filter die where used only seasonally?

A Yes, but they will return with about two weeks' of use.

Q Is animal feces more dangerous to us than human?





A Research is being done on pathogens in deer vs. bear vs. human feces and no conclusion has been drawn.

Q Are Brita filters effective?

A Yes, only if the filters are changed frequently.

Ron Hein, ROWP and
Manager of the Onsite
Wastewater Program
with Applied Science
Technologists and

There are currently over 500 Registered Onsite Wastewater Practitioners (ROWP) in BC who can plan, install or inspect systems.
Before new regulations in 2005, Health Officers inspected during installations and gave final approvals.
Now only an Authorized Person does inspections at the start of the installation, throughout the installation and the life of the system.
Oversight has moved from a 'contractor' mindset to a more professional mindset, with the guidance of a 330 page Standard Practice manual.

Speaker	Discussion
Technicians of BC	<p>It covers soil profiles, and provides charts and options and includes maintenance schedule information. Systems should now last the same 50 years that a house lasts, and put groundwater at far less risk. Authorized Persons will also audit and help with problems and help pick an ROWP.</p> <p>Q When a septic tank is pumped is anything left behind to continue biological activity? A No, tanks should be cleaned out as completely as possible. And the longer in length that a tank is the better it functions because there would be more travel time.</p> <p>Q Do Authorized Persons approve gray water systems? A Gray water systems are not covered in the regulations but the ASTTBC is encouraging the government to change that.</p> <p>Q Can an ROWP be sued? A Yes, in fact Ron Hein serves as an expert witness in some cases.</p> <p>Q Is there a registry of ROWP's? A Yes – on the ASTTBC website.</p> <p>Q How rigorous is the ROWP training? A Planning and installation requires 160 hours of training (in Alberta its 36 hours)</p> <p>Q Can raised gardens be planted on a septic field? A Yes, but only put plants in that have shallow roots.</p>
Graham Tabaczuk, ROWP and Regional Supervisor for Premier Tech Aqua	<p>Premier Tech Aqua has a unique “Ecoflow Biofilter” for biofiltration, using peat moss as a replaceable filter. System features include:</p> <ul style="list-style-type: none">  Low operating and installation costs, various models offered  Maintenance average annual cost that is half that of an aerobic treatment unit  No startup or shutdown procedures  Highest level of treatment available in BC – type 3






Speaker

Discussion

 Filter that lasts 8 to 10 years and is changeable via easy access lid
 No soil load and suitable for small or rocky locations
 Inspection and annual maintenance provided by Premier Tech Aqua
 Information available at www.ptenv.com

Kerry Anne Sheehan,
UV Pure Technologies

UV Pure Technologies has 'Crossfire Technology' that facilitates ultraviolet light treatment of potable and waste water effluent:

-  This broad spectrum UV kills cryptosporidian and giardia
-  There are no by-products and uses little energy
-  Maintenance consists of bulb changing, made easy by design. Remote control is available
-  There is no overheating during non-water periods
-  Models include the Hallett, which can be used for both potable and waste water treatment



Q Is the light on all the time?
A Yes, otherwise the life of the bulb and ballast will be reduced. Power consumption is 180 watts.

Q Do you need to add special components to remove iron?
A No the sensors are self-cleaning, but prefiltration to remove turbidity will strengthen the UV light.

Q Do you have systems run by solar energy?
A Yes, in Jasper National Park

Q How often does the bulb need to be changed?
A Approximately once per year, at a cost range of \$130 to \$210 per bulb.

Q How will a power outage affect the system and the water?
A The only affect will be that the water will be untreated.

Speaker	Discussion
<p>Bob Davey, President, Advance Environmental Inc.</p>	<p>Bob Davey prepared two presentations, both of which are attached. 10.2 has general geological information on the Gulf Islands and 10.1 is specific to the Biorock filter treatment system.</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p>mayne island society.10.2.doc</p> </div> <div style="text-align: center;">  <p>Mayne Island Society.10.1.doc</p> </div> </div>
<p>Erwin Dyck, Supervisor, Health Protection and Environment, South Island, Vancouver Island Health Authority, on <i>Sewerage System Regulations – Old and New</i></p>	<p>Pre-2005, local Health Authorities inspected waste water treatment plants before permits were issued. Local building permits sometimes were issued without inspection of the system installation. Since 2005, new regulations require acceptance of an Authorized Person – either an ROWP or a Professional Engineer. This approval must be accepted by the Health Authorities. They do not review or reject filings. Health Authorities now issue permits for holding tanks and take complaints about health hazards spotted after plant installations. They do not deal with complaints about locations, setback, quality of work – those go to the APEGBC.</p> <p>Q Gabriola Groundwater Quality Management Program gets bad water results but can't get appropriate government response. Who can they report this to?</p> <p>A Erwin Dyck and Jenny Mcleod will discuss details off line.</p> <p>Q Will the Gulf Islands be paying for their own analyses soon? How frequently can tests be done?</p> <p>A Some Health Inspectors will continue to come to the islands for tests done as their schedules permit.</p> <p>Q Can approval be sought for gray water use in toilets in rural areas?</p> <p>A No approval is required for gray water use inside residences; but regulations will soon cover gray water that leaves the building.</p> <p>Q Does VIHA regulate rain water systems?</p> <p>A Residential yes, commercial use, no. Single family dwellings are excluded from the Drinking Water Protection Act. Backflow preventers are highly recommended in these systems.</p> <p>Q Why is operator training not required to manage systems for under 500 residences?</p> <p>A Systems vary widely and one standard does not fit all. This is up to the individual districts to look after - the liability that they face will force appropriate certification.</p>

Speaker	Discussion
	<p>Q To whom can changes to the Act be suggested?</p> <p>A Write (don't e-mail) the Minister of Health and the Minister of Healthy Living and Sport.</p>
<p>Jim Marion-Lambert, owner of a new wastewater system on Mayne Island</p>	<p>House renovation and expansion necessitated a larger capacity, and legal septic system. Gray water system designed as part of the same project worked well. Both aerobic and non-aerobic treatment tanks were installed. Cost was about \$30,000, started in June 2007, finished June 2009.</p> <p>The design and approval system that was experienced through the project needs improvement:</p> <ul style="list-style-type: none"> ■ Better communication and coordination between all involved would have made the project easier ■ Better clarity as to what was required would have saved money and time ■ A local one-stop shop for project management, run by a technologist, on Mayne Island, is badly needed ■ This project manager would have an overall sales package with deliverables, plans, schedules, estimates, maintenance information supply.
<p>Mary Cooper, President and Program Director, MIWSS</p>	<p>Very good news received from Islands Trust: they support, and have furthered to the provincial government the recommendations from MIWSS with regards to the perils of hydrofracturing. Concerns expressed by the Gabriola Groundwater Quality Management Program about bulk groundwater extraction and sales were also supported by Islands Trust.</p>
<p>John Richardson, Premier Plastics</p> <p>Bill Warning, VP, MIWSS, and Ron Hein, ROWP, with information for a home seller or purchaser</p>	<p>Premier Plastics has designed a square, flat, low profile storm water holding tank with four apertures that retain its shape and prevent bulging. Tank is designed for small areas or alongside buildings.</p> <p>How do I locate a septic tank?</p> <ul style="list-style-type: none"> ■ Push a piece of rebar or steel probe into the ground to find the tank. It is likely to be nearest the bathroom; a pipe will be exiting the house. ■ The distribution box will likely be 10 to 12 feet away from the house. ■ A flushable transmitter or pipe camera can be used ■ An ROWP can assist.

Speaker	Discussion
Prize Draw	<p>Sincere thanks go to the contributors of the prizes: John Richardson of Premier Plastics, Jeanet Horth of Fred Surridge Ltd., Bob Davey of Advanced Environmental, Remax Realty</p> <p>And thank you to our Community Supporters:</p> <ul style="list-style-type: none"> 🏠 Mayne Island Lions Club 🏠 Gulfport Realty 🏠 Remax Real Estate 🏠 Bob Connelly: sounds system <p>And the Local Trust Committees of:</p> <ul style="list-style-type: none"> 🏠 Mayne Island 🏠 North Pender Island 🏠 South Pender Island 🏠 Saturna Island 🏠 Galiano Island <p>And:</p> <ul style="list-style-type: none"> 🏠 Southern Gulf Islands CRD Director Ken Hancock <p>And the Water Industry Exhibitors for Adding to the Draw Prize List</p> <p>MIWSS Wishes to Thank Everyone for Making the Annual Water Workshop Possible and Accessible to all Islanders Who Care About Our Islands' Finite Water Supply.</p>

Rosemary Bennett, ROWP
presentation

1.

Good morning & thank you to Mary Cooper and the Mayne Island Integrated Water Systems Society for inviting me to speak today.

This morning, I'm going to talk about the Secret Life of Your Septic System, which for many people is a complete mystery, since most of the components of your system live underground and are rarely seen until they start causing problems. Unless you were fortunate enough to watch your system being installed, chances are that you have only a general idea of where the system is located and an even hazier one as to how it functions.

In May of 2005, there were substantial changes made to the sewerage regulations regarding septic system design and installation, and the role of the health inspector was essentially removed from the inspection process, as the responsibility for design and installation was downloaded onto the private sector. My husband and I completed the required courses offered by the West Coast Onsite Wastewater Training Centre at Royal Roads University in Victoria, and became Registered Onsite Wastewater Practitioners, or "ROWP's". There are four designations which can be obtained from this program, Installer, Planner, Maintenance Provider and Inspector for Residential or Commercial systems. We are also required to be members of the Applied Science Technologists and Technicians of British Columbia, or ASTTBC, as part of our professional qualifications.

As mentioned, I had the honor of being the first woman in British Columbia to obtain the Registered Onsite Wastewater Practitioner designation as an installer and designer. My husband and I have been installing septic tanks and fields for many years now, and we also manufactured our own concrete septic tanks for a number of years. We have installed over 350 septic systems of varying types since the 1980's.

SO, FIRST of all, we're going to look at the process of designing a typical septic system, and the factors that affect the design. Then we'll look at some basic septic system types and their components,

2.

tips on how to keep your system functioning properly, locating your septic tank and causes of common problems. Followed by a brief look at the potential costs to replace a failed system.

A septic system starts with a site inspection of the property in question, followed by percolation test to determine how quickly water drains through the soil, and an assessment of the soil conditions, including depth of soil, soil type and any underlying limiting layer which may be present, such as a high water table, hardpan or clay, that will affect how the surface water drains into the ground. A percolation rate is established by timing the drainage of a specific amount of water poured into the test holes.

After the site inspection and percolation test, a scale drawing of the proposed system, plus a completed mandatory information sheet required by the local Health Authority, and a component list of the various materials used in the septic system are drafted up. This package is referred to as a Sewerage Filing, and it presently costs \$200 to submit the filing to the Vancouver Island Health Authority, where it is good for two years. Once it lapses, it must be submitted again as a new filing with brand new paperwork and another \$200 fee. A filing is required for new construction, an alteration or repair, or an amendment such as a correction, to a earlier form. A certification letter, maintenance plan and final documentation are submitted to the local Health Authority after the septic system is installed.

If you are planning an addition to an existing dwelling, please note that you will need a letter from an Authorized Person, stating that the existing septic field is adequate for the proposed addition, or you may be required to enlarge the septic tank, the field or both if the existing is not adequate.

DESIGNING A SYSTEM

When we design a residential septic system, the size of tank and area of dispersal field are based on the greater of the number of bedrooms or the total square footage of the dwelling, the daily anticipated flow of effluent,

3.

and the existing soil conditions. A simple gravity dispersal field, known as a Type 1, may not be suitable for the ground conditions, and a Type 2 system, which involves more intensive treatment of the effluent, may be required, or even a Type 3 system, which must be designed by an engineer. The daily flow of effluent plus the soil type and perc rate establishes the "hydraulic loading rate" which tells us what size of septic field is required, and how much effluent can be applied per square metre of field.

WHAT COMPONENTS MAKE UP YOUR SEPTIC SYSTEM?

Typically, your septic system is comprised of a tank, usually made of concrete or plastic, which receives the raw effluent from your household drains, including the toilets, sinks, showers, bathtubs and laundry equipment. The tank may contain either one or two compartments, and sometimes you may have paired single compartment tanks depending on the size of your system. A simple system like the one shown here has a two-compartment tank, a distribution box and a dispersal field. A single 4" pipe takes the effluent from the dwelling to the septic tank, where the "solids" in the effluent settle out and are retained as sludge in the first compartment of the tank, and the remaining liquid moves into the second compartment. Some primary bacterial action also takes place within the tank with a floating layer of scum. In a typical gravity fed system, once the entire tank fills with the effluent, the excess liquid gradually spills out of the tank into another pipe which conducts it to the distribution box or "d-box". The d-box receives the effluent and doses it out in equal amounts to the piping in the dispersal field, where the bacteria in the effluent work on the waste to break it down even further, forming a "biomat" within the trenches in the ground. Eventually, the water in the field, once the bacteria has further broken

4.

down, filters gradually through the ground and rejoins the ground water supply in a much cleaner form. Most bacterial action takes place in the top 18" to 24" of soil.

The dispersal field can be designed in various ways. A basic field usually has three, four or five "runs" or trenches, which in older systems contain lengths of perforated plastic pipe bedded in drain rock (show sample) or more commonly in new systems, flat bottomed trenches with plastic "infiltrators", or gravelless chambers (hold up sample) connected together to form the runs.

From the level d-box, via piping, effluent is fed equally to each run, so that no one part of the field receives more than another. Every run is laid with a very slight amount of fall, to draw the effluent down the length of the run. An easy way to check that all your runs are receiving an equal loading is to examine the septic field site in the summer months, when you should see distinct lines with vegetation which is greener than the surrounding dry grass.

Some systems are fed by pressure distribution rather than gravity, in this scenario, piping is suspended from the top of the infiltrators, equally spaced holes are drilled along the piping, and an effluent pump is set up to "dose" the field at timed intervals, based on the hydraulic loading rate in the septic field. Valves are used to more accurately dose the field and prevent too much effluent entering at any one time, so that the field does not become saturated. With a pressure system, instead of a distribution box, there is a separate "pump tank" where the effluent goes after it leaves the main tank, and a specially designed sewage pump moves the effluent to the field. In systems where the septic field is higher than the septic tank, effluent can be pumped to a d-box and then fed by gravity into the field or distributed by pressure.

5.

Most of you here today will have either a gravity fed, pressure distribution or pump to gravity type system. These are called Type 1 systems. When you have a treatment plant as part of your septic system, this is known as a Type 2 system. With a treatment plant, you still have a septic tank or “trash tank”, followed by a self-contained treatment plant within another tank, which treats the bacteria much more aggressively before releasing the effluent to a scaled down septic field. There are also peat filter systems on the market, which do a similar job to a treatment plant, and we have a gentleman here today from Premier Tech Aqua who will talk to you about these systems in more detail. One of the big plusses of peat filters versus conventional treatment plants is that while a treatment plant should be in operation all the time, requires electricity and a pump to operate, and is really not suited for seasonal use, the peat filter will not be harmed by being idle. However, any treatment plant, whether mechanical or passive, will need regular maintenance by a qualified professional, and the maintenance is usually required every six months or every year depending on the type you have.

One of the big advantages for us here on Mayne Island is that most residents are very aware of the need to conserve water, so most systems never receive the amount of water that they were actually designed for, and should have increased life spans as a result.

What determines whether you need a Type 1 or Type 2 system? The biggest factor is the ground conditions. Visible soil mottling in a test hole will show the high water table and of course, water entering the hole is a good indicator of the water table depth. Where the water table is close to the surface, we can construct a “sand mound” or artificial septic field, on top of the natural ground, using what is called “C-33” sand, or sand which has been graded to a specific grain. Just like the in ground trenching, we then dig trenches in the sand mound and install infiltrators and pressurized piping to distribute the effluent load.

What determines whether you need a Type 3 system?

6.

Usually very severe space constraints or ground conditions will require an advanced treatment system. You will need a sewerage engineer to design the right kind of system for your situation.

WHAT DOES YOUR SYSTEM DO?

The whole purpose of the septic system is to take wastewater from the dwelling and remove it to the septic field where the bacteria present in the waste consumes itself safely, and return clean water to the ground. The bacterial activity in a conventional field works best within the top 24" of soil. A properly maintained system should last a minimum of thirty years, and the newer systems are intended to last as long as 100 years.

The solids in the septic tank do break down, but not all of them will leave. They form a sludge, with clearer liquid on top, which is then covered by a crust of working bacteria. If the sludge isn't periodically pumped out, it will eventually reach the outlet pipe from the tank to the d-box and migrate into the septic field, blocking the pipes and causing a system failure.

How do we keep the system functioning properly?

Most importantly, you should regularly pump out the septic tank, and how often you pump out depends on the usage, which generally means the number of individuals using the system. Usually every 3 – 5 years but you can go longer if you have a large septic tank and one or two users.

What you put into the tank directly affects how it performs. Personally, I don't recommend putting any commercial septic stimulator products in the system, as human waste contains literally billions of bacteria and it is really a waste of money to add any more. How to maintain a healthy septic system will be the topic of a talk today by Gail Pike from CRD, and I'm sure she will be ready and able to answer your questions on safe cleaning products and dos and don'ts for system maintenance.

7.

One item I will emphasize though, is never, ever, dump old drugs into your septic system, take them back to the pharmacy for safe disposal. This includes veterinary drugs and over the counter medications.

Gail also has copies of a brochure titled "How to Find a Septic Tank" with useful advice on locating a system where there are no filed drawings to refer to. Locating an old system can be difficult. The best way, of course, is to get the original installer to look at the site and see if he or she can locate it, otherwise you need to look for flattened areas that might indicate the septic tank, greener lawn areas that may indicate the trenches or the d-boxes, or tracking the original waste pipe from the house to see if you can find where it enters the tank. Most times you are going to be concerned with finding the tank rather than the field, because the tank will need to be pumped out. The septic pump out people can also flush a tracking device down the toilet which will aid in finding the tank.

What can go wrong with the septic system?

The most common problem with septic systems results from **not pumping out** the tank on a regular basis. We still get calls from homeowners with backed up toilets, who confess that they have never pumped the tank out in the 20 or 30 years since the system was installed. Get your tank pumped out on a regular schedule. Gulf Islands Septic, who service most of our systems on Mayne, can help you out with a pump out schedule and also keep records of tank pump outs, so if you have just bought a property here, you can usually find out when the tank was last serviced.

SOME OTHER COMMON PROBLEMS:

BLOCKED PIPING. Sometimes the single pipe from the house to the tank will get blocked, usually you need to get a plumber in to fix this. Generally the blockage results from something flushed down the toilet that causes an obstruction. However, if the plumber can't solve the problem, then you need to look farther along the line.

8.

A BLOCKED FILTER. Most newer systems will have an effluent filter (show example) in the outlet tee of the septic tank, to catch hair or any other floating matter that hasn't settled out in the septic tank. The filter can be removed through the inspection port over the outlet, cleaned and put back. If it's really badly blocked or deteriorated, buy and install a new one. Filters are usually available from hardware stores. They should be removed and flushed out about every two years, using a garden hose.

D-BOX SETTLING. Often, the d-box, which was level at the time the field was constructed, will settle over the years and will no longer dose the runs of piping equally. The solution is pretty simple, find and dig up the d-box and re-level it. There are plastic dials called Speedy Levelers (SHOW SAMPLE) that you can use adjust the flow to each run, if the d-box does not already have these. If you know how many runs of piping make up your field, it's pretty easy to count how many are showing green in the summer and if there aren't as many as you know you have runs, the box may need leveling. Sometimes you can get roots growing into the d-box as well, and these will need to be cleaned out, and you should check to make sure the roots haven't grown into the header pipes going to the septic runs.

BROKEN PIPES. Never drive or park on your septic field. In time, piping can crack, break, or crush, especially the pipes from house to tank or tank to field. The piping within in the field can be damaged or infiltrators can be crushed and driving on the field will also compact the soil so the field won't work as efficiently. Do not run livestock on your septic field for the same reason, fence your animals out.

ODOR. Sometimes odor means the field is malfunctioning, however, if there is no sign of standing water in the field, or soft spots, the toilet is flushing normally and there is no other visual or physical evidence to suggest a problem, your toilet vents may be to blame. Mechanical treatment plants which are not used regularly can also be a source of odor, until they have had enough effluent to start working effectively again. The source of odors can be difficult to pin down.

9.

BROKEN OR COLLAPSED TANKS. While this is usually pretty rare with newer tanks, it can happen, especially with some older tanks which may have wooden lids or corroded concrete lids. We have seen old tanks made from 45 gallon oil drums, fiberglass spheres, and cedar boxes. As long as the tank is intact and watertight, it shouldn't cause a problem, but wooden lids can cave in, metal rusts and tanks can simply start to break up from old age. The usual cause of tank collapse is a vehicle driving over the tank and crushing the lid. Provided the septic field is not affected, you can replace the tank with a new one, once you remove the vehicle that got stuck in it.

CATASTROPHIC SYSTEM FAILURE. This is a very bad situation. Usually this is the result of solids making their way from the unmaintained tank into the d-box and blocking the septic field runs. It can also result from tree or plant roots filling up the piping and blocking the flow. And occasionally excess groundwater can flood up through the system as well, when there is no curtain drain above the field to divert it. The runs will back up, and untreated sewage will begin to bubble up and spill onto the ground. There will also be an unmistakable, and very nasty odor when this happens. This is a serious health hazard.

How much will the system cost to replace?

You are looking at a very expensive fix with a system failure. Chances are that the tank and field will have to be replaced and upgraded to the current standards, which are tougher than the pre-2005 requirements. If the ground is poor, you may well be looking at installing a treatment plant as well, even if you had a conventional gravity system prior to the failure.

With some older systems, the septic field and water well may be within 100' of each other, in which case you will have to get a sewerage engineer to see if it is safe to put the new field a shorter distance from the well.

Ball park figures – and please don't phone me up and expect us to install at these prices, as they are only a general guideline and every installation is

10.

slightly different because every site is unique. I mention these potential costs to emphasize just how important preventive maintenance is:

At least \$13,000 for a simple 900 gallon septic tank and 210 feet of conventional infiltrator septic field for a three bedroom house, up to 175 square metres in size. (or 1885 square feet)

At least \$15,000 to \$25,000 for a treatment plant and septic field for a three bedroom house up to 175 square metres.

\$25,000 to \$40,000 or more if a Type 3 engineered system is required. With these systems, the engineer calls all the shots, designs the system and puts his or her seal on the documentation. We are not involved directly in the designing of the field, we work under the engineer's instructions.

WHO CAN FIX YOUR SYSTEM?

In British Columbia, only a properly qualified Registered Onsite Wastewater Practitioner (ROWP) can design, install or repair a septic system, or a professional engineer with a specialty in wastewater. Not all engineers are qualified to do this type of work. Homeowners can no longer install their own septic fields or make repairs without employing a ROWP.

The best investment you can make in your septic system is to maintain it properly and address any problems promptly with qualified personnel. Properly maintained systems will reduce the risk of groundwater pollution and help to keep our environment clean and healthy. There is no excuse to ignore a malfunctioning system and the potential cost to human, animal and environmental health.

Thank you very much for listening, and I hope this information has been helpful to you all. Are there any questions?

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Presentation to Mayne Island Integrated Water System Society Workshop 1 May 2010

Presented by Robert A Davey President Advanced Environmental Inc and Davey Consulting and Agrolgy Ladysmith B.C. V9G 1C8

- 1) Introduction to company history. Biofilter and Biorock units. Both are trickle type filter with oxygenated media biodegrading effluent.
- 2) Testing of Biorock units completed in the Netherland under a European protocol BRL K10002, and EN12566-3
- 3) The Biorock is fed directly either by a pumped distribution, or, as normally used, gravity flow from a primary treatment plant to the intake of the Biorock unit. It provides controlled (trickle) flow to an inert absorbent media. It provides a large surface area of on the media surface with an oxygenated environment that allows microbes and bacteria to actively work.
- 4) It degrades dissolved organic matter and suspended solids under aerobic conditions.
- 5) In a secondary portion of the Biorock filter anaerobic conditions are promoted after the initial aerobic treatment and this anaerobic process reduces nitrogen levels within the effluent.
- 6) The Biorock treatment system encompasses more than just the treatment plant, and is enclosed within a Norwesco North American manufactured PVC tank

(concrete tanks or extra heavy duty direct bury PVC tanks are also available) both the filtration and biological digestion system, the filtration of the effluent and then a holding areas for the remediated septic fluids before disposal by an included effluent pump to a ground disposal area. The included pump is factory fitted with high /low level floats and high water floats and control panel for either demand dosing of timed dosing and recording modules for cycle time and pump counts.

- 7) Competing types of aerobic septic filters consist of flooded bed systems, rotating aerobic digesters and in-ground digestion systems
- 8) Primary treatment of the residential effluent is required as a precursor treatment of effluent in a treatment plant that incorporates trickle filtration and remediation. If required partial re-cycling of the effluent can be considered to reduce still further the nitrogen levels of the effluent and both disinfection of the final product by chlorination and de-chlorination or UV sterilization to produce a type 3 effluent is possible.
- 9) The benefits of the trickle type filter include a) No plugging of the media even at high loading rates b) Media has very high surface area and this media retains water for a long period of time so that bacteria can degrade organic contaminants BOD₅ and TSS even in the normal shut down mode or when the primary effluent supply is interrupted c) it nitrifies ammonium a precursor to the reduction of the nitrogen in the final effluent.ref. C Jowett Waterloo Ont.1997

- 10) Due to the unique filtration and trickle system this type of filter able to accommodate intermittent use of the residence as the bacteria are able to be reactivated after relatively long periods of shut down quickly and are ideal for summer cottage use of high and low use cycles and periods of complete rest or shut down. i.e. lodges, guest houses cabins and remote residences.
- 11) Due to the system of aeration of the media a small 50w fan is normally fitted to the unit as and integral part of the design however in areas where no power is available natural drafting by an vertical stack is possible and can be installed integral with the residential septic stack or paced on the vertical portion of the residence. In addition either solar charged battery or 12v pump can be used for effluent discharge or the enclosure can be designed to be surface mounted into an above ground enclosure and gravity discharge used from the plant.
- 12) With either solid filter such as, Sand Filters, Peat soil and Plastic trickle filter beneficial microbes attach themselves to the exterior surfaces of the medium and renovate the wastewater as it passes over the surface of the medium. The greater the exterior surface area of the medium and the greater the retention time of the wastewater the better the quality of the effluent.
- 13) With all filters and treatment plants these units must be capable of maintaining their wastewater loading rates for many years without plugging blinding and with little maintenance. In the case of sand and soil filters and recirculating sand filtration decreasing [see sand filter loading rates criteria] the size of the particle

grain increases considerable the surface area and retention time of the fluid but it also decreases the porosity of the media at the same time. In addition decreasing the grain size decreases the size of the “throats” or “Interstices” between the grains. The size of these interstices is critical in that they must pass the wastewater through from pore to pore but they are very susceptible to bridging and plugging by micro bacterial colonization. A balance between too coarse and too fine grain sizes is necessary for sustainable single pas treatment in sand and soil filters. In addition the narrow throats tend to remain water wet by surface tension forces and impede air flow through the sand or soil filter requiring a low rate of loading to maintain aerobic conditions i.e. air and wastewater compete for the same void space in the medium.

- 14) With trickle filter media surface area is increased with irregular shapes and roughening the surfaces to increase microbial attachment and retention time in increased by multiple passes of the waste water over the medium i.e. by constant recirculation by a portion of the effluent. Similar treatment can be obtained using coarser sand with recirculating loads i.e. a recirculating sand filter. Aerobic conditions are easier to maintain in trickle filters because of the high porosity of the medium allows ventilation and loading at the same time because the air and water do not compete with the same air space as they do with sand and soil filters.
- 15) The loading rates of some sand filter and soil filters enable them to sustain treatment without production of

biological solids however the low loading rates of sand filter require that large volumes of soil or , often imported sand, an expensive proposition in many areas. By recirculation many times through sand gravel large volumes of wastewater can be treated in a small area but single pass treatment cannot be obtained because of the need for the competing physical properties of the pore space requirements.

16) The ideal filter therefore requires the high surface area and adherence to microbial attachment high interconnected porosity for microbial growth and water flow, high retention time of waste water adjacent to the microbial populations separation of the air and water paths for high loading rated and a small treatment plant low or no solids production, ease of maintenance light weight for transportation, and consistent medium properties using a common synthetic material. We feel that the basaltic rock-wool medium fulfills all these requirements by the following:-

17) Whereas the wastewater in solid particle filters i.e. sand, or peat flows around the particle the absorbent Biorock filter functions by transmitting the wastewater through the filter and the interior of the media. These inter-particle (interstitial) flows have the benefits of increased water retention capacity and provide more aerobic capacity with low solids production. The lower anaerobic digestion zone with nitrogen reduction also reduces solid production. Air movement between the filaments of the Rockwool allow loading at high rates of hydraulic loading with

ventilation at the same time in comparison with sand soil and other trickle filters.

- 18) For increased volumes and adaptability for each project the trickle filter may be placed in a series configuration to combine a small footprint with high volumes of treatment and re-cycling of low strength effluent i.e. school use.

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Presentation to Mayne Island Integrated Water System Society Workshop 1 May 2010

Presented by Robert A Davey President Advanced Environmental Inc and Davey Consulting and Agrology. Ladysmith. B.C. V9G 1C8

- 1) Introduction to company
- 2) Regional geology books on soils of the Gulf Islands
- 3) Regional Geology Reference: Dr Dianne Allen Simon Fraser University.: J.Muller Geology of Vancouver Island 1977, and Surficial Geology Vancouver Island J Fyles
- 4) Canadian System of Soil Classification NRC 1998
- 5) Age of rocks 90Ma of the Nanaimo Group of sedimentary formation.
- 6) Average thickness of rocks in each series as rocks are inter-bedded rather than successively layered
- 7) Deformation approx 40ma years ago resulting in both folding i.e. plastic deformation, faulting and movement up and down the fault plane, and of lesser intensity slip planes along zones of contact between rock type and fracture where the tectonic movement surpassed the strength of the rock
- 8) Fractures may be concentrated in zones of weakness or widely spaced depending upon the strength of the rock and the associated tectonic forces.
- 10) Folds faults and fractures and individual bedding planes, all play an important part in the development of ground water allowing precipitation to enter the ground water system and

also saline ocean water if the water pressure of the ocean is the same as or greater than the ground water pressure.

11) For ground water withdrawal refer to Dr Allen report on fracture and fault zone influence of ground water withdrawal and cones of influence. Zones are not always concentric in zones of influence of fractures or faults but become skewed by the action of the structure.

12) Water levels are therefore dependent upon the geologic structures and the recharge which again is seasonal dependent. Lowest water levels are normally at their lowest in October before winter recharge. If ground water levels become lower each year ground water is being removed at a greater rate than normal recharge can handle and the aquifer is susceptible to contamination by extraneous fluids.

13) Glacial action upon the Gulf Islands has greatly modified the islands structures by both erosion and submergence of the land forms and this action has transported both soil from and to the island and modified the present topography greatly. The last ice age approx (12 to 13000 years ago) had removed up to 150m of surficial rock from the original land form and the weight of the ice had caused compression of the land forms into the magmatic layers removal of the weight of the glacial ice has lead to isostatic rebound of the land forms increase in the height of the oceans, formations of raised beaches, glacial striation of the harder formations [not really noticeable in Mayne} but very noticeable on the igneous formation on central Vancouver Island and the movement of both to original components of the rock i.e. sand silt and clays and start the formation of our present surficial soils.

14) Surface action of both wind rain and scouring of glacial water deposition of sediments and compaction of the surficial soils has lead to the present day topography and soil structures

1) Transmissivity and interaction of the surface water and ground water is normally around +/- 30 days but in the areas of faults fractures can be much slower or faster. The surficial

geographical structure affect the water transmission into the ground water table with sandy loams having high transmission rates and silty soils lowering the rate of movement of the surficial water. The action of the prior glacial deposition events subsequent soil building events, erosion and re-deposition of the soils and human management of the surficial layers all must be considered and are of prime importance in the discharge of effluent from human waste and into both the surface water system and hence by logic eventually into a ground water system.

16) Both fresh water and marine discharges of effluent are not within the mandate of The Ministry of Health Living and Sport the VIHA as both of these type of discharges are regulated by the Ministry of Environment under the B.C. Reg 129/99 Municipal sewage regulation with only accredited professional being able to design these system and register the design with the MoE. Re-Use of grey water not permitted in B.C unless within a city of municipality where building department has authority for interior plumbing fixtures and can certify the installed system. It is permitted under MoE regulations.

17) Soil type produced from breakdown of underlying rock or from importation of soils from glacial action

Sand USDA specification 2.00mm to 0.05mm

Sandy loam

Silty loam

Silt

0.05mm to 0.002mm

Clay loam

Clay

0.002mm and finer

18) Percolation/hydraulic conductivity rates of soil types and why it is important.

It would appear that slow percolation rates and therefore slow movement of fluids would be good and allow all fluids a long time to reach either the ground water or to a breakpoint point. This is not so, as slow (Tight soils) i.e. clays have little pore space and therefore no oxygen content and the remediation of

fluid (effluent is a contaminated fluid) is required to provide bacterial breakdown of the effluent. However very open soils, gravels and coarse sand, [less than 1min/inch percolation rate] although high in oxygen content allow the fluids to travel very fast, both horizontally to a breakout point and downwards into the water table. Ideally up to a 10 day travel time in the ground before any intersection into water bearing strata or breakout point is desirable

19) Separation must be maintained from the discharge point in the ground to the water table or impermeable layer i.e. clay and normally a separation distance of 2ft is required from the point of entry in the soils and the interface of the ground water. Hence raised mound systems are common with standard type discharge systems.

20) Measurement of percolation vertical and unsaturated hydraulic travel rate and hydraulic conductivity (Saturated Horizontal travel) rate standard test pit to 36" deep and 12" x 12" or permeameter such as Pask Permeameter; Double Ring infiltrometer, or a Falling Head bore hole test

21) Clay soils with high water levels normally show and absence of roots as no oxygen to support vegetation growth and often mottling were the iron soluble salts in the soil precipitate as non-soluble salts; and produce a rust staining; on the colloidal clay particles. Water levels are often stagnant in these type of soils and do not allow any water to pass into the ground water system and when the lower water horizons often used to provide a source of drinking water are isolated from the i.e. protected aquifer

22) Standards of discharge of effluent using TSS BOD₅ and Fecal coliforms

Primary septic treatment Influent 100 to 400 mg/l and TSS 100-400 BOD₅ Effluent 20-55 mg/L TSS and 100 -140 Mg/l BOD₅
Secondary regular Effluent 45mg/l TSS and 45 mg/l Bod₅ and
High strength Secondary 10mg/l TSS and 10 mg/l BOD₅ No reduction in fecal

Tertiary 10 mg/l TSS and 10 mg/l BOD₅ and less than 400 cfu /100 ml fecal count

23) Only very specific installations now allow gravity discharge, most septic tank systems use float activated on-demand dosing to either good native soil raised mound to separate the distance of the effluent point above the winter water table in the ground

24) When difficult soil conditions are encountered, or high discharge volumes are needed due to size of residence etc effluent above the standard of primary discharge may be called for to either protect the environment, reduce the surficial impact of the discharge point by cleaning up the effluent to a high standard, and therefore allow a smaller disposal field and less biological digestion in the soil or the physical limitations of the property. High strength secondary treatments provide a greater environmental remediation within a closed system but reduce the fecal count of the effluent to a level considerably greater than normal secondary but not as high as a tertiary treatment system

25) Type 3 or tertiary treatment is required when the highest quality treatment is necessary, often when the footprint of the system must be as small as possible, a well is within the immediate vicinity (Limitations for distance from well still apply), a very high water table exists, when an original installation fails and very limited ground is available for a new system and the potential for a human health hazard exists.

26) Criteria for selection of septic disposal systems.

Standard Sewerage System design manual version 2 using soil type hydraulic loading rates etc must be used.

27) Environmental impact and position of potable water supply. Due to the remediation of the effluent in the ground and the possibility of pathogens i.e. virus etc which have a long life span the minimum distance from a septic field edge and the potable water well is 30m (100ft)

28) In addition to the pure remediation aspects of sewage treatment the hydraulic loading rate must also be considered and most designs limit the distance for any slope surface because to the chances of lubrication of the strata, breakout of effluent at high dosing rates of effluent etc. By using low impact systems these problems can often be avoided and provide increased soil stability and the low hydraulic impact of the effluent to the soil. These system i.e. Filtered Geoflow drip disposal systems on a 29) hr (limited timed dosing)basis will often lower, soil movement, slope stability, vegetation loss and or removal which will occur with other systems due to a large footprint of system and high hydraulic dosing raters. Slope stability and possibility of improving the area by stabilization and re-use if the effluent by allowing vegetative uptake of the nitrogen and phosphorus while still allowing bacteria action of the effluent in the soil

30) All work in assessment and design to be completed by a certified ROWP “ planner” or Registered Professional whose education and experience are within the necessary criteria

31) All installation to be completed by a certified ROWP “installer” or is completed by under the direct supervision of a ROWP certified as an “installer” or Registered Professional as above.

32) All installation to be completed by the certified designer and with a certification by the installer and with a signed document by the owner of the property who shall maintain the system in accordance with a written maintenance agreement