From: ***PERSONAL IDENTIFIERS REMOVED***
Sent: April-15-10 1:16 PM
To: Living Water Smart ENV:EX
Subject: Gabriola submissions
Attachments: Draft OCP Water.pdf; Rainfall.pdf

Hi,
Enclosed is the current draft of a OCP advisory sub-committe on water. It has not been approved, but may be of interest.
Thanks,

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Attachment: Rainfall.pdf

Gabriola Rainwater Harvesting Tank Sizes Required

http://www.island.net/~gm_chin/rain.html 0.8 Recovery Consumption 37.5 gallons per person

		Roof Size s	800	1200	1600	2000	2400	3200	1 Person	2 People	3 People
		mm from graph	Gallons								
Jan	31	120	1570	2354	3139	3924	4709	6278	1163	2325	3488
Feb	28	96	1256	1883	2511	3139	3767	5022	1050	2100	3150
Mar	31	79	1033	1550	2067	2583	3100	4133	1163	2325	3488
Apr	30	54	706	1059	1413	1766	2119	2825	1125	2250	3375
May	31	42	549	824	1099	1373	1648	2197	1163	2325	3488
June	30	40	523	785	1046	1308	1570	2093	1125	2250	3375
July	31	26	340	510	680	850	1020	1360	1163	2325	3488
Aug	31	27	353	530	706	883	1059	1413	1163	2325	3488
Sept	30	42	549	824	1099	1373	1648	2197	1125	2250	3375
Oct	31	77	1007	1511	2014	2518	3021	4028	1163	2325	3488
Nov	30	133	1740	2609	3479	4349	5219	6958	1125	2250	3375
Dec	31	139	1818	2727	3636	4545	5454	7272	1163	2325	3488

Storage levels in tanks

	1 in 800	1 in 1200	2 in 2000	2 in 2400	3 in 2400	3 in 2400	3 in 3200
	1 Tank	2 Tanks	3 Tanks	3 Tanks	4 Tanks	5 Tanks	5 Tanks
	1800	3600	5400	5400	7200	9000	9000
Jan	407	1192	1599	2384	1221	1221	2791
Feb	613	2025	2638	4050	1838	1838	4663
Mar	483	2413	2896	4825	1450	1450	5309
Apr	65	2347	2412	4694	194	194	4759
May	-549	2008	1460	4017	-1646	-1646	3468
June	-1150	1668	518	3336	-3451	-3451	2186
July	-1973	1016	-957	2032	-5918	-5918	59
Aug	-2782	383	-2399	766	-8346	-8346	-2016
Sept	-3358	82	-3276	164	-10073	-10073	-3194
Oct	-3513	430	-3083	860	-10540	-10540	-2653
Nov	-2899	1915	-984	3829	-8696	-8696	930
Dec	-2243	3479	1236	5400	-6729	-6729	4715

Note: Start January 1 with an empty tank

Attachment: Draft OCP Water.pdf

DRAFT April 5, 2010

Water Supply Objectives

1. To manage the island's fresh water resources on a sustainable basis.

   Reasoning:

   Climate change models show the likelihood of warmer and somewhat drier weather in the future. Even more important is the possibility of a longer duration of warm dry summer like weather, and a higher variability of weather.

2. To have a sustainable long term domestic water supply available to all individual properties sourced from within each property.

   Reasoning:

   Today every property can obtain a sustainable supply by means of rainwater collection and storage. Cisterns of 10,000 gallons are usually considered sufficient for two people to store sufficient domestic water for the summer dry period. Groundwater resources are also available in many areas, so that existing or new wells provide a sustainable supply, but depend on water table levels being maintained. Hence the most economic solution may be a mix of rainwater collection and groundwater usage, depending on individual preference and location.

3. To promote groundwater resource conservation in order to protect water table levels for both domestic and agricultural consumption and protection of tree canopy coverage.

   Reasoning:

   Domestic Consumption

   Wells remove water from the water table, and then return the water to surface areas in the septic field. Most will eventually percolate into a water table, but some will be lost to surface evaporation, and water is moved from one area to another. Many methods are available to reduce domestic consumption, composting toilets, dual flush toilets, grey water storage and use.

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Horticulture

Green vegetable gardens and flowers are a major benefit to Gabriola. Unfortunately virtually all of the water used will go to evaporation. Responsible users will provide winter storage of water in ponds, cisterns, or tanks for use in summer gardens. A new moisture sensor that does not rust is available for irrigation systems, and has been presented on Gabriola by the RDN. Groundwater usage for horticulture or swimming pools should be discouraged in water table sensitive areas.

Agriculture

Many acre-feet of water can be evaporated by irrigation, which is a major issue in other areas. The B.C. Agriculture Department is very sensitive to this issue, with recommendations for required usage. Agriculture numbers for open water stored for irrigation indicate a 14" evaporation on Vancouver Island over the summer. Groundwater usage for irrigation should be discouraged in water table sensitive areas, and monitored in all areas.

Water Supply Policies

Reasoning:

Many, if not most policies can depend on community cooperation, and other off island authorities. However the use of regulation is necessary where irresponsible action results in damage to another. We have a good method in the 'danger tree letter' used by residents to inform a neighbour that a tree represents a danger. This removed the plea of not being aware of any problems in any legal action. Unfortunately cause and effect is not as clear in cases where irresponsible use of groundwater runs a neighbour out of water. This situation can be improved by the widespread use of well watchers, which can document water table reductions, and zones of influence of heavy users.

1. To undertake a program to map water storage area levels on all of Gabriola.

   Reasoning:

   An aquifer storage map of Gabriola is necessary to provide guidance for development and consumption. Catchment areas usually have a considerable amount of water stored, until it either runs off, or

Attachment: Draft OCP Water.pdf

percolates through the aquifers to the ocean. Rubble along cliff faces can store a great deal of water, and wells directly adjacent to the bottom of the rabble areas have a large supply and a large flow. The reverse is usually the case for the areas on top of the cliff, as in general, water flows downhill. There are other differences based on geology and the strike and dip of the strata and the permeability.

Careful consideration of the following issues is necessary in order to create a reliable aquifer storage map for use with bulk groundwater extraction as follows:

a) An independent assessment of the subject location for ground water availability by an independent, registered, professional Engineer/Hydrologist who has a proven history of planning a community water supply, and who has liability insurance to cover potential short falls.

b) The perimeter limits of the subject aquifer shall be delineated by a similarly qualified professional Engineer/Hydrologist.

c) A dedicated monitoring well shall be in place for a minimum of one year in the subject aquifer. The monitoring shall be capable of recording daily baseline groundwater levels.

d) All residents living on the subject aquifer shall be notified one year in advance of application to extract, to provide existing residents an opportunity to establish pre-existing groundwater conditions in their residential wells.

2. Bulk Water sales from Gabriola sources are essential as a safety factor acting as a backup to individual supplies. Bulk water sales as a home activity should be limited as follows:

   a) At least two bulk water source extraction areas should be necessary as a long term supply.

   b) Sources should be limited to high aquifer storage areas as defined in the Islands Trust Aquifer Storage Map.

   c) Paved roads to the property are required to prevent summer dust.

   d) Surrounding wells shall be supplied with well watchers, and pumping will cease if water table levels fall to within 26 feet of the bottom of the surrounding well.

3. Bulk Water sales from ALR lands will be discouraged in order to sustain water table levels for agricultural uses.

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4. Bulk water importation to Gabriola by pipeline shall not be permitted, and by truck shall be discouraged. Until the aquifer storage map issues are resolved, emergency deliveries of bulk water shall be permitted from Nanaimo.

   Reasoning:

   Depending on Vancouver Island management of water sources may not be sustainable in the long term, and may be interrupted if there are water shortages in Nanaimo, or river levels are not sufficient to maintain salmon spawning.

4. Islands Trust staff will maintain a water table map and recording system, based on community volunteer calibrated well watchers, with records kept on a monthly basis.

   Reasoning:

   Education of new residents and summer residents is necessary in order to achieve our water supply objectives. Information on a current basis is essential to make residents aware of their responsibilities.

   The B.C. Ministry of Environment maintains several test wells that are monitored. In other areas there are many well watchers maintained by individuals, which measure the depth of water from the end of the air hose in the well to the water surface. Water table levels can be obtained by calibrating the well watchers, measuring the distance from the surface to the water table, and the elevation of the surface. From that point on the water table can be calculated from the well watcher reading. Generally the aquifer will be filled up to the surface in the winter. Monitoring the dropping table levels in the summer will indicate problems and provide information to indicate water table sensitive areas.

   Salt water contamination is a direct result of reduction of water table levels. For each foot of water table elevation above the mean tide line, fresh water flotation produces 13 feet of fresh water below the mean tide line. Hence for a well extending 260 feet below the ocean level, the water table and long term well water levels must be maintained at least 26 feet above the mean tide line.

5. Water storage in any form shall be encouraged, particularly in ponds, dugouts, and cisterns.

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Water Supply Advocacy Policies

1. The RDN parks shall be requested to allow a beaver pond in the swamp area of the 707 Acre Wood.
2. The RDN building code approval will require 10,000 gallon cisterns and rain catchment plumbing and filters in all new houses in areas marked on the aquifer storage map as having minimal groundwater.
3. The RDN building code approval will include requirements for house tanks in all new house construction not requiring cisterns.
4. The RDN building code approval will include requests for permeable parking lot surfaces to reduce run off.
5. The Ministry of Transport (Highways) shall be encouraged to use run-off areas for highways ditches to allow water to soak into the aquifers prior to being channeled into creeks to the ocean.
6. Supply of two or more residences from the same well falls under the VIHA water supplier regulations

Attachment: Draft OCP Water.pdf

Liquid Waste Management Objectives

1. To ensure domestic and agricultural sewage does not produce biological contamination of groundwater, surface water, and the marine environment.

   Reasoning:

   Health dangers exist not only in well water contamination, but also recreational activates, and marine products such as clams and oysters. A current indicator of problem areas are the Fisheries and Oceans closure areas for marine harvests surrounding Gabriola.

2. To ensure chemical runoff and seepage does not produce contamination of groundwater, surface water, and the marine environment.

   Reasoning:

   Petrochemical contamination of groundwater from leaking storage tanks is frequent, particularly as the tanks age and corrode. Every year we treat our roads with calcium chloride and other chemicals for ice removal and dust suppression. Our 'Texada Slime' was once thought to contain arsenic, although tests did not confirm its presence. Wear from rubber tire and break pad worn out on the roads end up in ditches together with discarded plastic. Agriculture fertilizer over use can run off into a marine 'dead zone', although we may not have a problem here.

3. To preserve groundwater aquifers as a viable storage medium for domestic and commercial consumption.

   Reasoning:

   The original Gabriola Groundwater Management Society signs at Gabriola entrances proclaiming that 'Gabriola is a groundwater sensitive area' were necessary because in most large urban areas groundwater quality is irrelevant. As we move to more and more rainwater collection, it is tempting to ignore groundwater contamination. 'Out of sight, out of mind' is tempting, but for long term sustainability we need the aquifer storage option.

Attachment: Draft OCP Water.pdf

Liquid Waste Management Policies

Reasoning:

Sewage installations for either domestic or commercial new construction are the responsibility of the Ministry of Health, or as the heading now says, Ministry of Healthy Living and Sport. The key player is the Health Inspector who must approve the plans, and is responsible for the contractors installation. The engineer and contractor must have extensive training, and although there may be errors, the ultimate quality depends on the Health Inspector. Our experience has been that inspectors err on the side of caution more than anything else.

A much larger problem is the maintenance and operation of existing sewage systems. Often constructed many years ago, these existing systems may or may not have been maintained. The likelihood that septic fields remain in good condition is even lower. In the larger scheme of things, large governments download to lower governments, and so on down the line. The last stage is to download onto property owners their responsibilities which are correctly theirs. Our job is to find opportunities for the maintenance requests.

1. The old ‘biffy’ hole in the ground, should be permitted for all single family properties.

   Reasoning:

   In spite of our wish to be modern and progressive, the old biffy is perhaps one of the most environmentally sound sewage methods. As no water is involved, sewage decomposes gradually, and seldom migrates into the aquifers. Eventually the material becomes compost.

2. Composting toilets do just that, and operate without sending contamination into the aquifer. These facilities should be allowed without a septic system installed provided there is a functional grey water cleaning system.

   Reasoning:

   An existing septic system is still required to handle kitchen sinks, bath tubs and showers, unless there is an alternative grey water system. Vegetative systems have been developed and do work for grey water. They have not been proven for sewage.

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3. Farms located on sloping properties or containing winter running streams should be required to install ponds and vegetative buffering systems to process agricultural runoff. An exception for closed feeding systems such as chicken farms, where all waste is removed to a second location should be allowed.

   Reasoning:

   Agricultural runoff can range from nothing at all to enough to turn the Black Sea into a dead zone. Living fish in a runoff pond are proof of viable biological oxygen demand in the water.

4. Runoff from the Village area should be sampled by having a sampling sump downstream of the Village area. Samples should be tested by the BC Ministry of Environment in the same manner as industrial areas, and the results published on a regular basis.

   Reasoning:

   Education of island residents requires hard data rather than appeals to motherhood. Many industrial areas have run off water sampling and testing, usually by using trout fingerlings. 'The fish died' has a direct incentive to do better on all of the various things we can control.

5. Plowing and sanding the winter snow on our roads is much appreciated. Highways should be encouraged to use sand rather than salt wherever possible.

   Reasoning:

   Winter rural roads have been traditionally a challenge. We have gradually moved into the assumption that we would not install winter tires and chains, but would expect the roads to be maintained to a summer level. Not driving in snow is an option, but eventually people get caught with changing weather conditions.

6. Summer dust remediation, particularly due to the limestone dust embedded in 'Texada Slime' is much appreciated by the residents. While paving is expensive, a chip seal program should be established to eventually replace the rural gravel roads.

   Reasoning:

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Chip seal road surfaces have lasted for many years on low traffic roads, depending on the quality of the base. Gravel roads have a much higher maintenance cost with gravel additions, grading, and summer dust remission. Driver's costs for damaged brake linings are significant.

7. Property transfer is an ideal time to bring sewage maintenance up to a reasonable standard. Islands Trust should provide a recommended check list for new property purchasers which would include building inspections, septic tank inspections, and septic field inspections for inclusion in the subject to list at the cost of the seller.

   Reasoning:

   Although sellers are responsible for full disclosure of defects prior to sale, the more frequent response is that they were unaware of any problems. Although the process is voluntary on both parties, Real estate sales include many pieces of paper, and often some of the warnings go unheeded in the fine print. A more up front, coloured, recommendation from Islands Trust is necessary for the many factors that are different from other areas with Gabriola purchases.

8. Pump and haul septic systems should have the property address and quantity recorded at the RDN dump site. The RDN should then make a direct purchase of a pump and haul removal for that address, in the event of a reasonable lapse of activity, based on historical quantities. Costs would be added to taxes.

   Reasoning:

   Pump and haul systems will overflow into the environment without the benefit of a field. Although there may not be active use for some summer residents, problems have surfaced with property transfers when the responsibilities are not clear.

9. Septic systems involving an accumulation sump, and pumping to a higher field should have a record of inspection verified by the RDN on a regular basis. Newer septic treatment systems also involve pumping to process the sewage and prevent overflow into the environment. A more frequent check, such as every 3 years would be appropriate.

   Reasoning:

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Power supplies on Gabriola frequently brown out during the fuse blowing sequence as a tree shorts out the high tension line. Although these pumps are highly reliable, and have a warning system, it is a more complex system than the standard flow septic system.

10. Traditional Septic systems tanks can last as long as 20 years without requiring pumping, but can clog up in a few years depending on the input material. A record of inspection verified by the RDN should be necessary every 5 years. Recording of the address during dumping at the RDN site would constitute such a record, or the property owner could submit an inspection report from a person other than the property owner, without the cost of pumping.

    Reasoning:

    More as a process of education, existing property owners should be aware that their septic tank can plug up mostly from float or sediment. The primary tank outlet is 24 inches below the tank top and 24 inches above the bottom. Float tends to dome and is deeper at the boundaries, so 16 inches of float will be very close to plugging the outlet. Inspection is not difficult, but requires finding and removing the septic tank main cover, and pushing a stick into the float and sediment to measure the thickness. Unfortunately many property owners would prefer to ignore the whole process.

11. Some Septic systems empty directly into the ocean. Health authorities should declare the properties unfit for occupation after a suitable remediation period. Islands Trust is quite capable of checking all waterfront properties for Ministry of Health installation applications and approvals.

    Reasoning:

    Summer properties evolve from tents to campers to cabins to year round residents. Sometimes things do not get upgraded in the process.

Liquid Waste Management Advocacy Policies

1. The Ministry of Healthy Living and Sport shall be requested to allow a vegetative grey water treatment in single family housing construction.

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Given approved vegetative grey water treatment, single family housing shall be requested to allow composting toilets without a septic system.

2. The Ministry of Environment will be requested to install runoff sampling systems located at the request of Islands Trust. In the event of systematic failure of agricultural runoff, the Ministry of Agriculture and Lands will be requested to enforce ponds or vegetative buffering systems to process agricultural runoff.
3. The Ministry of Transportation and Infrastructure will be requested to encourage sand instead of salt for winter road maintenance.
4. The Ministry of Transportation and Infrastructure will be requested to produce a long term cost/benefit study for replacement of gravel residential roads with chip seal roads.
5. The British Columbia Real Estate Association will be requested to provide a due diligence inspection requirement for septic systems, including tanks, treatment systems and fields, specifically targeted to the Islands Trust mandated area.
6. The Regional District of Nanaimo Wastewater Services Division will be requested to actively monitor all pump and haul septic systems on Gabriola by the means of recording the address of the source of all pump and haul disposals into the RDN wastewater systems. Given a lapse in the regular disposal, the RDN will be requested to initiate pump and haul sewage removals from that address, and will charge the property owner with the cost.
7. The Regional District of Nanaimo Wastewater Services Division will be requested to institute an inspection system of septic treatment systems and accumulation sump pumping systems, by qualified inspectors to ensure that the active pumping systems are still operational.
8. The Regional District of Nanaimo Wastewater Services Division will be requested to institute an inspection system of all traditional septic tank systems, recording either the address of septic tank pumping when disposed in the RDN wastewater system, or by means of an inspection report not signed by the property owner or residents of the property.
9. The Ministry of Healthy Living and Sport shall be requested to provide septic system installation reports for all waterfront properties on Gabriola Island. The Islands Trust will then request that any properties not having a valid septic system installed should have their habitation permit cancelled.