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Subject: Mid- Halton

WWT Plant Expansion

Dear Mr. Ohashi,

It is understood that water and wastewater servicing infrastructure is essential to all communities, however the process of growth first, followed by remedial measures to correct the environmental damage later, have failed. The current version of the Halton Master Water and Wastewater Plan will in my opinion only lead to further degradation of our communities and Lake Ontario, if we do not slow down and alter how we grow.

The reason why we need to alter our thinking arises from what has been called the three P's relating to degradation of the aquatic environment ?
People, Pollution, Phosphorus.

The following thoughts are offered with those three factors in mind with emphasis on phosphorus control, since this is a key factor in controlling

the growth of Cladophora and the resulting massive odour problem along our shoreline in late Summer and Fall.

{My apologies for the typing and rather messy layout since I was forced to do a "scissors and paste" job after losing much of the material due to a power outage last night. (saving to file frequently would have been much a much better option than relying on an UPS back-up system!) Since the deadline is tomorrow I simply have run out of time to do further editing.}

1) Change in Land use in the Region and effect on Phosphorus run-off:

The Proposed construction of an expansion to the Mid-Halton plant is a logical extension of an earlier HUSP study (and its environmental assessment review at the time) which gave the "green light" for an urban expansion to proceed in the Region and identified preferred water and waste water strategies.

However, in my opinion there is an urgent need to review the HUSP study and its conclusions as to sustainability and lack of adverse effects before we proceed with WWT expansion under the Halton Water and Wastewater Master Plan since we now have a potential crisis from P inputs to the near-shore waters of Lake Ontario.

The Master Plan Speaks to the "assimilative capacity" of Lake Ontario as a receiving water and I believe this should be reviewed and updated to take cognizance of changing conditions.

The HUSP study is, I understand, currently being reviewed. At the Mid -Halton Algae/ Sewage Treatment Plant Public Meeting on January 29 , 2003 it was mentioned that the 5 year revision of HUSP had just started but there was some uncertainty as to what stage this is currently at on the part of Regional staff.

I do not believe the original environmental assessment included a review

of possible elevation of phosphorus (P) losses through changes in land use resulting from urban expansion and I wonder if the present HUSP review includes such a study. Erosion and sediment control would doubtless have been studied to include the short-term land impacts of change of land use which can be seen in peak runoff and erosion and for the long-term impacts of a change in land use which are manifested in the average annual runoff for an area.

(In the section below on "Non-Point" sources of phosphorus (P) and in the attachment I have presented evidence from other studies of the increase in P transfer which may be expected, in grams per hectare per year, from land to the aquatic environment when urbanization takes place)

1) Thermal Bar:

2) Thermal Bar:

To my knowledge the existence of the thermal bar which traps nutrients and heat in the near shore waters of Lake Ontario for two or more months in the Spring of the year was not taken into consideration in setting P loading limits for Mid-Halton (or indeed for any other WWT plant discharging directly to the Lake to date) in the Ministry of the Environment C of A's for P loadings or concentrations. It appears that effluent target concentrations and loadings of P have been set by the Province for Lake Ontario WWT plants using criteria developed through IJC total P loading figures which were designed to keep P levels in the Lake as a whole at 10 micrograms per liter of P or less -- a concentration level of P which would not lead to eutrophication. In other words the Lake is treated as a vast "sink" largely unaffected by gradually rising P loadings.

3) Zebra Mussels:

Certainly few people could have foreseen the effect of the invasion of zebra mussels in enhancing the clarity of the near-shore water thus allowing Cladophora to grow at greater depths and colonize a much greater area ; or the possibility that the zebra mussels may, through their feeding and excretions, recycle P or make P more bioavailable. These are additional factors which need to be taken in to account by setting much lower current levels for P concentrations and loadings at our WWT plan

4) Habitat

A further factor in considering the need to reduce P loadings to the near-shore waters of the Lake from Burlington to Toronto as much as possible from all sources arises from the fact that we have rocky shore bottoms along this stretch of shore which provide ideal habitat for Cladophora to grow.

5) Area of Concern (AOC) ? request for funding and involvement at Federal/Provincial level

Given the extent of algal growth problems we have had recently when climatic conditions are favourable such as those in 2001 and the resulting outcry from Lakeshore residents about the huge odour from decaying algae I would have thought that the Town of Oakville and Halton Region plus other affected municipalities would have been actively lobbying the Federal and Provincial governments to have the area declared an AOC in order to obtain funding to carry out a remedial action plan (RAP) prior to consideration of any expansion of STP's in the Region

The amelioration of local eutrophication problems in "areas of concern " elsewhere in the Province has been addressed through just such P control and in my opinion the conditions of the nearshore from Burlington to Toronto warrants similar "AOC " attention.

Murray Charleton from Environment Canada at the recent Halton public forum on January 29th presented figures showing P levels in the

nearshore waters which appear to be trending back to historic 1970 levels where we had severe problems with Cladophora .

Do we really want to wait until we encounter the same situation as in the 1970's , when remedial action was taken only at a very late stage ?

Regardless of the sources of P (point -source , non- point sources, atmospheric , internal

sediment loading) the overall P loadings will undoubtedly increase with urbanization unless

we institute stringent P controls.

6) CONTROL of POINT SOURCES

Increasing P loadings from WWT point sources in Halton/ Oakville will result from increasing volumes of waste to be treated from burgeoning populations. We each excrete approx 0.4g of total P per day. Almost all of this P ends up at our WWT plants.

WWT plants are, as a result, a major source of soluble and readily bioavailable P (70- 80% of total P) . Therefore, the first objective in controlling algal growth in the nearshore waters of the lake should be to reduce P loadings from WWT plant effluent sources as much as possible.

To operate the Mid-Halton plant expansion under a C of A from the Province at levels permitting 1mg/L of P and a loading of 50Kg P/day for the proposed expanded Mid-Halton plant is unthinkable.

Of course the Region and staff are well aware of this and have been

taking steps to reduce P concentrations and loadings from all our WWT plants to well below their respective C of A limits.

However, I do not believe either the Region or the Province has perceived an urgent need to enact really stringent control on P levels at the present time. My reason for believing this arises from statements made by staff at the January 29th meeting regarding the expansion of the Mid-Halton plant. They indicated that total loadings of P to the Lake would not go up from present levels but would remain about the same -- at least that was my impression and parallels similar comments received in earlier conversations with Region staff. Is the Region really satisfied if WWT effluent P loadings only keep up with expansion in population and be content to possibly reduce P levels further only over the longer term?.

It should be kept in mind that the theoretical conversion of P to wet weight of algal biomass should be multiplied by a factor of approx 500 -- i.e. for every Kg of bioavailable soluble P, 500Kg in wet weight of algal biomass could be produced with no other nutrients required -- the only other requirements being adequate sunlight and temperature for algal growth to occur.

In other words up to 1 metric ton of algal biomass could be produced for every 2Kg of soluble P discharged. With current loadings of around 25Kg/day of mainly soluble P from the Mid-Halton and SW plants alone there is a considerable potential for massive algal growth to occur locally under the right climatic conditions.

If we were to reduce effluent concentrations at the Mid-Halton and SW to say 0.15mg/L total loadings would decrease to about 9 Kg /day or about one third present levels assuming no increase in connected population/ sewage flow. While one cannot say with certainty that this would eliminate or even reduce the algal problem I believe there is a chance that at some point if the P input is reduced far enough the nearshore Lake water P

concentrations may through dilution reduce to a level of less than 20 to 30 micrograms per liter.

It is generally considered that a body of water will change from oligotrophic conditions to eutrophic (algal producing) conditions at levels above 20 micrograms per liter of available P.

The present level of P in the open waters of Lake Ontario are approx. 10 micrograms/liter

Before any WWT plant expansion I would like as a condition for approval to see Halton and the Province treat P loadings from WWT plants discharging to the nearshore waters of the Lake Ontario in the same way as P loadings from the Milton plant, where there is a maximum P loading limit designed not to cause eutrophication in the receiving water (Sixteen Mile Creek) .i.e. to P levels below that where eutrophic conditions can occur. It is ironic that the Milton WWT plant cannot be expanded because P loadings to the Sixteen Mile Creek would be exceeded and yet it appears to be perfectly acceptable to export the sewage collected from urban expansion in the Milton area to an expanded Mid-Halton plant for treatment to exacerbate the P loadings and Cladophora problems in the near shore waters of Lake Ontario.

In Europe WWT plants discharging to sensitive inland lakes the effluent levels have been reduced to levels of 0.05mg/L of P using biological treatment ---so the technology exists.

With a projected increase in population in Oakville of nearly 20% by 2008 I think there is an immediate requirement for drastic remedial action to be taken since we already have an algal problem at existing P levels .

7) NON- POINT SOURCES:

There is always going to be debate over the relative contribution of P from non-point sources as opposed to point sources. In the absence of sufficient local watershed data I extracted the following from a US study of 928 non-point source watersheds on the transference of P

from terrestrial to aquatic systems. This study and the figure which I have re-copied as an attachment (Omernik, 1977) was designed to show the phosphorus loss in runoff as a function of land use in the U.S.

This U.S. survey of 928 non-point source watersheds in the U.S. (Omernik, 1977) shows that P export increased as the proportion of land as forest decreased and as agriculture increased. What is interesting is the importance of forest and range land (or a mix of the two) in controlling P losses in runoff. The increased P losses from conversion to only 40% urban use is quite evident. It will be noted that the total P losses per hectare per year from only 40% conversion of land to urban use exceeded that from either 50% or 90% agricultural use and is almost double that of the other range and forest mixes shown in the diagram.

In Halton/Oakville for example only 500 hectares out of some 3000 hectares is being protected in the OPA 198 development (i.e. about 80% urbanization) and some of that land is on the Oakville moraine. In addition the Ontario Realty Corp. proposes to sell off 300 out of 445 hectares of mainly forested land owned on the Oakville moraine to developers.

While extrapolations from the figures shown may not be altogether valid it would look as if conversion to 80% urbanization probably would more than double the non-point P losses in grams per hectare per year if we assume previous land use was primarily agricultural, and much more than that if compared to forest/range land uses.

The potential for such increased P losses through urbanization within Halton and the adverse affect this would have on the Lake may not have been considered in the original HUSP study. Storm water run-off and control of sediment to streams and sub-surface watershed effects would have been considered in the review but I doubt if the potential

for increased P losses and possible effects on the inshore waters of Lake Ontario formed part of the study at that time.

There are offsetting factors which should be mentioned which diminish to some extent the potential contribution of P from non-point sources to algal growth.

These are:

Phosphorus in runoff and erosion from the landscape occurs as particulate phosphate (PP) and dissolved phosphate (DP). Generally PP is the major portion (75-90%) of phosphorus transported in runoff and erosion from land. The PP primarily consists of sediment and organic matter and contains both organic and inorganic phosphorus but it should be noted that only about 20 to 40% of sediment inorganic P is potentially bioavailable according to some researchers.

As mentioned previously in the case of WWT effluents, dissolved P is considered the most available form of P for algal growth (strictly speaking the bioavailable soluble reactive P which is the DP and a portion of the PP)

I submit that more stringent control of P from both point and non-point sources is now required in Halton Region and that a phased or controlled urban expansion be based on being able to maintain P levels below the threshold where nuisance algae occur in the nearshore water of the Lake.

8) MID-HALTON PLANT.

Biosolids management

Apart from the phosphorus control aspects I have concerns with the biosolids handling and disposal should the plant expansion be built. According to the Oakville Beaver (p4 Nov. 22, 2002) we are running out of land for landspreading of biosolids due to urbanization. In 1999, Halton had 2350 acres (I believe this should have been hectares) for spreading

compared to 1200 acres (hectares?) in 2001 and 769 acres (hectares) as of October 2002 .Since biosolids now contain a higher total P content (and likely to increase with increasing P removal from effluents using Fe or alum precipitation) there will be pressure to find alternatives or increase the P loadings to existing lands which I believe have something like a five year rotation for landspreading at the present time. If the agricultural portal for disposal of liquid biosolids is going to be curtailed in the Region through loss of agricultural land from increased urbanization or from competing agricultural requirements I foresee problems occurring.

At the present time temporary storage of biosolids is carried out at the Biosolids Management Centre where there are 10 tanks with a capacity of 80,000 cu metres capacity. In 2001 over 98,000 cu metres of supernatant from the Biosolids Management Centre (BMC) was trucked to designated WWTP sewer systems for retreatment. I quote from Halton Region --" due to the added stresses that biosolids supernatant may cause the WWTPs , the return of this material to the plants is on an "as necessary " basis only".

Now we are going to have to consider expansion of the biosolids program to consider options such as incineration, pelletization or what Halton staff considers the preferred option -alkaline stabilization. All of these will require dewatering, some more than others . What are the proposed plans for dealing with the increased volumes of supernatant, centrifugate or pressate? Will it be sent it back to the WWTPs for re-processing which already have difficulty handling the present volumes of biosolids supernatant? What adverse effects do retreatment of these liquids have on WWT operation?

What are the capital costs for these alternatives to biosolids handling which must be now considered as alternatives to landspreading owing to loss of agricultural land for sludge spreading in the Region. Also the requirement for increased haulage for further treatment and/or disposal elsewhere. Are these capital costs being allocated to the developers ?

Why are we considering approving expansion of the Mid-Halton STP if there is not a management system in place for the handling of increased biosolids. These biosolids will also contain high total P (increasingly so, if hopefully, we improve P removal from effluents) Do we propose to pelletize and sell the stabilized product as fertilizer as suggested in the Beaver (with a high P to N ratio) to whom ? --to be spread where? .

9) GENERAL REMARKS

The following remarks are primarily addressed to our Regional and Municipal councillors in seeking solutions since we need input from a fourth P to help in providing a solution and that is P for Politicians.

Councillors Allan Edgar and Kevin Flynn are trying valiantly at their own expense to draw attention to and educate us about the problems arising from growth in the Town and Region. They need assistance from other Councillors to persuade the Town and the Region that we need to involve and seek the assistance of Provincial and Federal Politicians. No presentation of facts or further scientific studies or "smart growth" will really matter if there is no political will to even consider, let alone fund, solutions to the environmental problems being created from Federal/Provincial mandated population growth in our Region. The Town and Region cannot and should not have to contend alone with environmental problems created by trying to fulfil what in the final analysis has been Provincial/ Federal mandated urban growth.

Of course remedial action will cost money but I think at the local level most people would accept increased municipal taxes to protect or improve the existing environment through more stringent controls. However, I do not think citizens would readily accept the projected costs of urban growth and a compounding of our present environmental problems if the figure of

a 47% increase in Regional taxes over the next few years, mentioned at the Halton meeting , was presented to them.

I think the Town and the Region should be asked (actually challenged) to publish for public comment those projected non-recoverable costs associated with urban growth development and their effect on municipal taxes over the next few years . Development charges seem to be woefully inadequate in recovering even partial costs from developers . I notice that recently in Halton Hills there were proposed increases ranging from over 100% to over 700% in development and planning fees and this would bring cost recovery to only 75% (previously 27.5%).

The Town and Region have always said to us that growth costs money but ,to my knowledge, have never said how much the required infrastructure is going to cost present taxpayers. I think we need to see the projected near term and long term projections and the cost recovery from developers with dollar figures attached as we expand our infrastructure. I suspect there may be a public outcry and taxpayer revolt if and when they see these figures.

Thank you for your attention,

Yours sincerely, D.K. Smith

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[IMAGE]

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