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Re: the Application for a Permit to take water by
Findlay Creek Properties Ltd. and 1374537 Ontario Ltd.
EBR Registry Number: 010-4134

Dear Mr. Taylor;

I have been informed that the deadline for comment has been extended, so would like to provide a few comments on this application for a permit to take water. By way of introduction, I was trained in chemical and biochemical engineering, worked for a period of time in enhanced oil recovery (which is similar to hydrogeology, but more complex), and have for the past several years worked as a science analyst and medical writer. My doctoral research was in biosorption, so I have some idea of what may happen to chemical contaminants as they move through a biological matrix such as peat. I am presently an adjunct investigator at the Children's Hospital of Eastern Ontario Research Institute by merit of my interests in health and the environment.

Hydrogeology

I first encountered this development proposal over 18 years ago, before the genesis of the idea of a "core" wetland, when it was commonly understood that in order for the most fragile and unique features to survive this wetland had to be surrounded by its fringe, and that the underground "bathtub" in which it sat had to remain unbreached. At that point it was evident that in order to develop the surrounding area as proposed in the current permit to take water, the wetland would be drained. In short, this is because it would be difficult to satisfactorily seal a berm at the base, and drainage to levels that would accommodate development would affect wetland water levels. The solution to the berm leakage problem at one time was to have water on the development side of the berm, but at later stages of approvals that was changed again in subsequent plan revisions. Dr. Micheal has thoroughly reviewed problems of inconsistent water level monitoring, and unclear protocols that favour inaction on "trigger" data. He also discussed that if the water drawdown within the wetland during pumping is indeed rapid, it is not logical to conclude that post-construction recovery of water in the wetland will also be rapid, because a permanent high-permeability conduit in the form of fill around the sewage pipes is to be installed that will enhance water removal, essentially mimicking the effect of a pump. There is presently no data nor established monitoring equipment in the wetland with which to ensure its long term protection, the record so far is poor with regard to wetland protection measures and aspects of the proposal are not plausible. If it was legal to carry out previous work without a permit to take water or with much smaller and shorter-term permits, then why would long-term permission be granted to remove such enormous amounts of water?

Importantly for this submission, it was established in the Golder reports that the deeper aquifer is connected to the shallow aquifer, such that artesian conditions exist at least sporadically on the

proposed development site; that groundwater flows from east to west, and the zone of influence of the pumping activity will cover the Gloucester waste disposal areas.

Toxic Contaminants in Groundwater

The perspective that I would like to share regarding the proposal to draw down the water east of Albion Road has to do with migration of toxic chemicals from the Gloucester Landfill and Special Waste Sites west of Albion Road. These sites have been well described over the years, and are described in the Golder report in support of the application. Attempts have been made for over 10 years Headwaters Environmental Services Corporation on behalf of Transport Canada to pump and treat the toxic wastes from this site. There are over 20 chemicals identified on the Gloucester List, including vinyl chloride (a carcinogen) and 1,4-dioxane (IARC class B2, a probable human carcinogen; on Health Canada's most recent list of priority substances for review).

More than 8,000 ppb 1,4-dioxane along with several other contaminants was found in a groundwater sample reported in the 2002 Annual Report by Headwater Environmental Services Corporation, *Subsurface Monitoring Report, Spring/Summer 2001*, prepared for Transport Canada. The highly contaminated sample was verified by a second laboratory, and subsequent samples from the same site were at elevated albeit decreasing levels. Interestingly, the highly contaminated sample was obtained during a period of high precipitation when access was difficult, and since then sampling under these conditions has not been reported in the Annual Reports (the most recent available report is from 2005). Sampling over the past several years has been conducted annually, at times when the groundwater is low so that the ground is firm and allows easy access to monitoring sites. Thus, the sampling conditions that lead to the highly contaminated sample are systematically not being replicated. This is important because it is a reasonable hypothesis that highly contaminated water remains deeper in the aquifer underlying the Waste Site, and that this water would emerge sporadically when heavy rains create the local hydraulic head necessary for this to occur from, as the waste sites are upslope from the development site.

Over 8,000 ppb 1,4-dioxane is substantially higher than the previous groundwater contamination guideline level of 65 ppb, and ordinarily would have triggered increased cleanup and precluded building on the site. Instead of these actions, a site-specific level was granted by the Ontario MoE, of 50,000 ppb 1,4-dioxane. This was at least in part justified by a site-specific risk assessment carried out by Franz Environmental, that concluded that 1,4-dioxane would not pose a risk to inhabitants of the proposed subdivision should the fumes seep into the basements. The Sierra Club of Canada retained Daniel Green to review these calculations, and he found that the consultants used an outdated model, with incorrect parameters that systematically lowered the calculated indoor air concentrations, and a groundwater 1,4-dioxane level that was much lower than the highest that had been measured. When recalculated appropriately, the indoor air concentration exceeded occupational guidelines, so would clearly be excessive for residential exposure of women and particularly young children who are much more vulnerable. As discussed above, it is plausible that high levels of 1,4-dioxane are sporadically appearing in the groundwater in the subject area, and it is not consistent with a precautionary approach to assume that this high level of 1,4-dioxane was an isolated incident. Should they occur, and should the calculations by Mr. Green be closer to the truth, it is possible and plausible that 1,4-dioxane, or other contaminants that would presently be captured by peat but would be mobile in backfill used for construction, could pose a risk to future residents. Drawdown of groundwater in the development area will increase the hydraulic gradient and it is logical to expect acceleration of migration of contaminated water from the vicinity of the Toxic Waste Site.

At the open house following the release of the Area Wide Risk Assessment, maps were displayed showing that the 1,4-dioxane plume went far into the wetland area, but that vinyl chloride apparently stopped at the wetland boundaries. When asked about this, the consultants said that the vinyl chloride

pattern was due to the efficacy of the pump and treat system. This hypothesis is not consistent with the facts that the wetland (peat) boundaries were far beyond the zone of influence of the system, and the pump and treat system was supposed to be effective for 1,4-dioxane (that did not stop at the wetland boundary) as well as for vinyl chloride (that did stop at the boundary). 1,4-dioxane is the most water-soluble of the chemicals on the Gloucester list, and thus would be the least prone to be absorbed by the peat that is presently in place. A hypothesis that is more consistent with both the observations and established science is that the peat is absorbing and remediating the vinyl chloride (and presumably other unreported contaminants with high binding to organic matter) in the groundwater. Peat is well known for this property. Indeed, peat-based sewage treatment beds are routinely approved by the Ontario MoE.

In order to build houses it is necessary to remove the peat which would otherwise subside once it is drained, and to replace it, generally with sandy soils. These soils will do nothing to absorb or degrade toxic contaminants, so this development will amount to removal of a demonstrably effective toxic waste treatment natural environment feature, to place homes in the way of expectedly increasingly toxic groundwater. Pumping of water according to the terms of the proposed permit to take water may be expected to heighten the potential for a worse scenario.

Concerns regarding contamination leading to potentially toxic basements have been brought to the attention of the federal government bodies and their contractors, Ottawa Public health, Ottawa City Council and personally to the applicant Mr. Dufresne, but to my knowledge the role of the peat in ‘sorption and remediation of Gloucester contaminants has not been investigated.

As you see, development in this area, pumping water, removal of peat, wetland preservation and protection of public health are intertwined, with this permit presently at the crux. I would be pleased to provide additional materials in support of these views should you require them. I hope that this information contributes to persuading you to deny the present application.

Sincerely,
Meg Sears M.Eng., Ph.D.