Mémoire on Avenir du secteur Pierrefonds-Ouest

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1. Introduction

The proposed Pierrefonds West project appears to be a very attractive development on many levels, from an esthetic, practical and environmental perspective. However there are numerous issues that make its location problematic. These issues and their impacts will be explored in this brief, and improvements and alternatives will be proposed for certain aspects. Where possible, optimization can be accommodated, but the overall priority is to promote a responsible and environmentally conscious development that does not consist of a destructive land use.

2. Background

The location of the proposed project in western Pierrefonds had been zoned agricultural, which was changed to residential, despite objections, including from the OCPM, to enable development of this vacant land. However that land is not "vacant", but is part of an ecosystem that actually provides services that are not accounted for in any standard cost/benefit analysis of development. These services include pollution remediation of air and water, and health effects. According to groupe Gestion Environnement, the area under consideration provides up to $759,857 per year in environmental services and natural capital[1]. So situating a development in this area would destroy the ecosystem and its capability to provide these services. It is important to note that the relationship between this capability and the size of the area is not linear. In other words, a quarter hectare cannot provide one quarter of the services that a full hectare does. Therefore conserving 40% of the area does not conserve 40% of the environmental benefits of the land mass of the entire project, but much less, as shown in Fig 1. Please note that while this represents eco services as a compounded whole, individual factors would follow their different individual trajectories.

Fig 1. Eco Services Provided
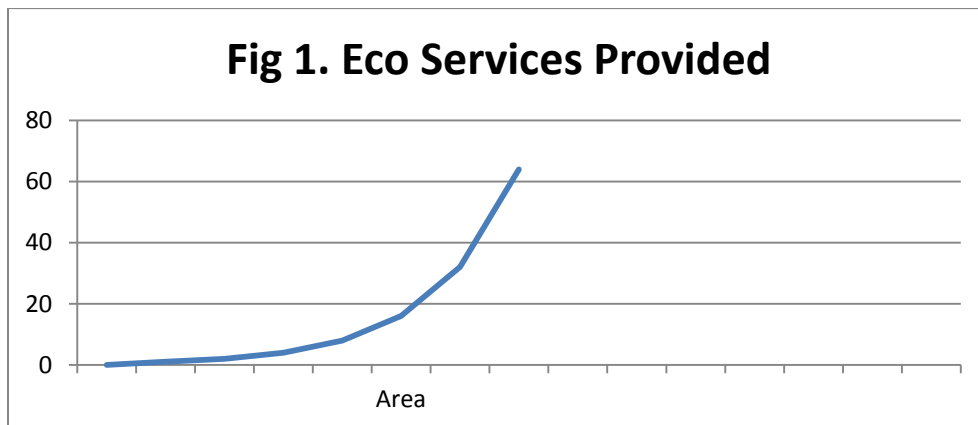
The development would remove a large area of actual green space, as well as trees, to be replaced by buildings, concrete, and asphalt, at the same time adding new sources of pollution such as greenhouse gases and airborne particulates

3. Biodiversity

To most people biodiversity means having birds, deer and giraffes in the world. To some people it seems to mean Hondas, Fords and Fiats. On a particular subspecies level, it means genetic diversity. This gives the organism the capability to survive environmental challenges such as diseases, and climate variations. Decreasing the genetic diversity leaves the organism more susceptible to pathogens and can lead to extinction. The clearest indicator of this factor is population numbers. Generally, the larger a species' population is, the larger the genetic diversity. Threatened species are automatically on the dwindling side of the diversity scale. On higher levels, species, it means various types of life, each having its own niche in terms of its food, and effects on and with the environment, including sometimes very complex and far- reaching relationships. We understand less than one percent of these relationships. For example, if you wipe out milkweed, the Monarch butterfly disappears as has happened around Montreal. Remove deer and the forest changes over time. Destroy bees and agriculture will suffer, endangering our food supply. Most of these relationships only become evident once they are in peril or have been decimated, at which point it is very difficult or impossible to restore them. Reducing biodiversity will reduce our quality of life in unimaginable ways, and may in an extreme case threaten our very survival in the long term. Having said all that, most people, especially politicians, will still ignore the consequences, believing that it is someone else's problem and it will be fixed.

However, Montreal has chosen to sign Biodiversity conventions, and in fact hosts the Office of the Secretariat of the Convention on Biological Diversity. Unfortunately, it seems that with the fervor of development being so evident in Montreal, this is only a great public relations stunt and is an example of greenwashing. In reality, Montreal is breaking its commitments by not implementing and executing biodiversity strategies, and is the host of this organization under false pretenses.

And so we come to the proposed project of Pierrefonds-west. The area in question is inhabited (i.e. not vacant) and visited by many species, some on the threatened list. This is the largest greenspace left on the island of Montreal, along with the greatest biodiversity. From birds, turtles, salamanders to deer, they depend on this greenspace, and if it is developed, some will move to the proposed park, but many will just abandon the region, and possibly perish. It is very difficult to understand how this is not in direct contravention of the stated aims of biodiversity and the international commitments that Montreal has undertaken.

4. Air Pollution

Air pollution in the modern world is mainly caused by human activity. The main sources are transport, industry, and heating. Air pollution has many components. There are greenhouse gasses that have climate change effects. There are harmful gases, such as sulfur dioxide. Some of these gases, such as ozone, are natural, but their concentrations may be above normal values, leading to harmful effects. Then there are particulates. Particulates less than 10 microns and especially 2.5 microns pose a serious risk to health. They enter through the lungs, which become a filter, and some then travel through the body where they are trapped, and can cause serious disease in the long run. (Unfortunately your lung filter is not as easily changed as your furnace filter.) This is not conjecture, but proven fact, as is shown by the slide below, from a presentation by the Agence de la Santé et de services sociaux de Montréal[2]. Recently, the Agence estimated that there are more than **1500 deaths per year in Montreal due to air pollution[3]**. This has to be taken very seriously by our elected officials and can no longer be ignored. This death toll is sure to rise with the increased pollution sources of urban sprawl development and the decreased capacity of green spaces to mitigate it. It is a health crisis, and this number does not include the many more than tens of thousands who are sickened and injured by air pollution every year

The World Health Organization (WHO) estimates outdoor air pollution to cause 3 million premature deaths worldwide per year in 2012, due to exposure to small particulate matter of 10 microns or less in diameter (PM_{10}), which cause cardiovascular and respiratory disease, and cancers **There is no safe threshold**, and even the lowest levels of PM have health impacts. Other pollutants, such as ozone, nitrogen and sulfur dioxides (constituents of smog) are major factors in asthma morbidity, and bronchial symptoms.[4]

The level of air pollution in the Montreal region is progressively getting worse. This is not surprising, as sources of pollution are increasing while nature's capacity to mitigate it is decreasing due to irresponsible development and destruction of the ecosystem. The graph below shows the air pollution level readings for Montreal for the year ending on April 25 2017, taken by PlumeLabs[5]. The chart is a compounded index value of air pollution factors including Particulate Matter, ozone, and nitrogen dioxide. The Y axis, or index value has 3 colours, dark blue for less than 20 (good), light blue for moderate, and grey for greater than 50, high pollution. These values also coincide with WHO values for Low risk, Impact risk for chronic exposure, and Impact risk for 24 hour exposure.
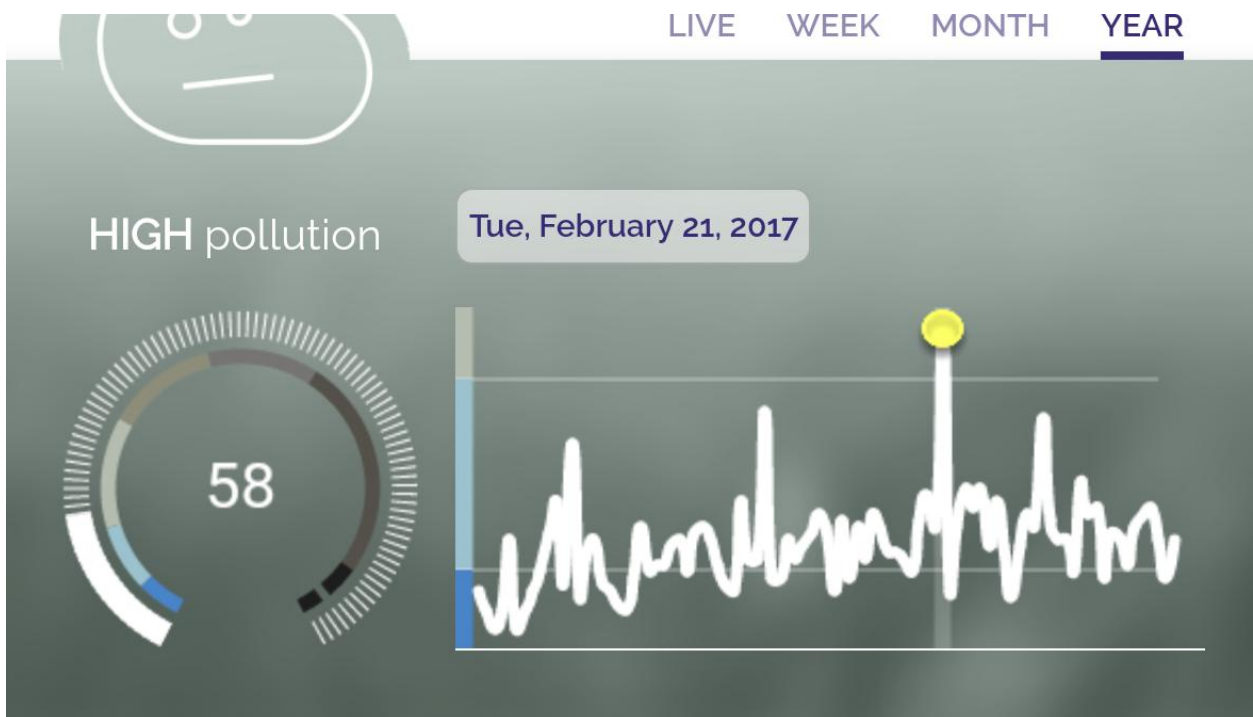
As one can see from the graph, the 24 hour exposure value was only exceeded on Feb 21 (at a level of 58) during the entire year. But if one studies this chart, two other nasty details emerge. One is that for most of the year, the value is in the mid range, or chronic risk, in other words, a risk for chronic exposure, which is the case. So Montreal almost consistently exceeds the WHO acceptable limit for chronic (long) term pollution level. The second piece of bad news is that the curve has a

slight uphill slant. This means that over the year, the average level is increasing. This is a public health crisis and it is growing.

5. Trees and their Environmental Role

There are numerous studies that show the importance of trees in the ecosystem. The effects can be divided into direct physical effects, and subjective, yet measurable effects. The direct physical ones are:

- Recycling of gases such as carbon dioxide, nitrogen dioxide, and other pollutant gases, into more natural, cleaner oxygenated air
- Carbon storage and sequestration to reduce climate change effects: trees remove carbon and render it unavailable to the environment thereby reducing the greenhouse effect of elevated atmospheric carbon dioxide. Trees in Toronto sequestered 46,700 metric tonnes of carbon in 2008, worth about $1.1 million.
- Particulate matter removal: trees capture and remove particulates from the air, eventually moving them into the ground. The charts below demonstrate these effects[14]. Note that the charts include trees and shrubs, and that removal of PM is 61%.
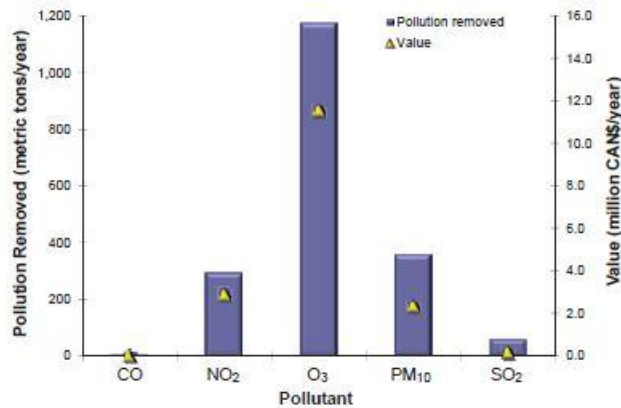

Figure 14.—Annual air pollution removed and value of removal by trees and shrubs, Toronto, 2008.

Table 10.—Comparison of pollutants removed by urban forest vs. emissions from facilities in Toronto

Pollutant	Urban forest removal (t/year)	Facility emissions (t/year)	Urban forest effect (%)
CO	10	894	1.1
NO_x	297	1,576	18.8
O_3	1180	n/a	n/a
PM_{10}	357	585	61.0
SO_2	62	195	31.8
Total (w/o O_3)	726	3,250	22.3

- Heat Islands mitigation: heat islands are areas that are hotter than the general region, and are caused by urban environments consisting of buildings, asphalt and concrete.

Forest cover can reduce temperatures by up to 9 degrees C by various means, such as shading the ground, radiating heat at heights, and evaporative cooling. This is extremely important during heat waves which occur more often.

- Flood Control: Heavy rain falling on the typical urban environment runs off the surfaces and must be channeled away. On the other hand, rain falling on a forest is soaked up by the trees, with minimal runoff
- Biodiversity and homes for animals: All sorts of animals live in trees, from birds, squirrels, to insects, and many more on the ground in the shade of trees.
- noise abatement: A forest soaks up noise

Subjective effects include:

- helping children develop mentally, as well as physically
- stress and depression reduction in adults
- recreation opportunities

There is a final point on trees. We keep hearing that the city is to plant 375,000 trees. This is supposed to balance the ones that have been or are planned to be cut. Unfortunately this is greenwashing. A mature tree is on average 70 times as proficient at pollution mitigation as a young tree, never mind a sapling. Below is a table showing the carbon and other pollutant treatment of various size trees[6]. As one can see, while planting trees may be helpful in the long term and should be encouraged, it is not a short or medium term remedy to replace mature trees lost in the present. It will take some 50 years or more for a newly planted tree to reach a size of 75 cm and be proficient at pollution remediation.

Table 3 - Air effects of average tree in Toronto by size			
Diameter of tree	Carbon stored (kg)	Carbon sequestered (kg/yr)	Pollutants removed (kg/yr)
0cm - 15cm	9	1	0.1
15cm - 30cm	89	6	0.3
30cm - 45 cm	283	12	0.5
45cm - 60 cm	655	19	0.7
60cm - 75cm	1176	29	1.0
> 75 cm	2709	52	1.8
Source: United States Department of Agriculture, TD Economics.			

6. Urban Sprawl

The development location is at the western tip of the island, far from downtown. It is not an efficient use of the space, as it is not densified, and is not Transit Oriented Development. Most people would have to travel a significant time and distance for work and other reasons. New developments should be dense, and close to the destination area that the public needs to travel to in order to minimize the displacement, pollution and climate change effects. The density and remoteness of the proposed project have a direct bearing on its sustainability, in particular in infrastructure costs and maintenance. This will be covered in the next section

7. Sustainable Development

Sustainable development means different things to different people. One definition is development that does not deplete natural resources. Obviously this one does not apply to the project since it depletes greenspace. The Brundtland report defines it as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs"[7] This one seems also to conflict since once greenspace is destroyed and the environment is degraded, it is impossible to reverse it. So it would appear that this is not sustainable development. But one can take another, wider interpretation, that of development that provides the capability to continue to live there. This has many aspects, including financial ones which we will explore.

The cost of the infrastructure is quite large. It includes building roads, sewers, drainage, electricity, and water supply. These costs are either passed through to the buyer thereby adding to the mortgage, or if undertaken by the municipality, by issuing bonds. Cities generally look very favourably at development because it broadens the tax base. But if one examines the extra services that need to be provided, such as police, lighting, garbage pickup, water filtration, schools, transportation etc., there is nothing left over. Quite the opposite in fact, in that almost all cities are in debt. And the bigger the city, the bigger the debt. So in most cases it is a myth that development improves the financial state of a city. Urban sprawl exacerbates this situation because most of the costs are distance (extended) dependant over fewer taxpayers. But the largest impact is 20 to 30 years or more in the future, when the infrastructures need to undergo major repairs or replacement at huge costs. At that point in time, the financial viability of the development becomes questionable, and it may become unsustainable. So it is very important that development occur with responsible and intelligent planning in every aspect of a project. Some sad examples of unsustainable communities can be seen in the USA, such as Youngstown, Ohio[8], and Baltimore, Maryland[9] below. In many of these cases, residents abandoned their houses, and the city condemned entire sectors of the city, shutting the water, power, and police patrols, and started demolition of the houses. Given the parameters of the proposed project, it is doubtful that it is sustainable, no matter which definition is considered.

However once again there is a commitment by Montreal, this time to sustainable development by its membership in the International Council for Local Environmental Initiatives (ICLEI). The ICLEI in turn is "committed to building a sustainable future" and its objective is "to become sustainable, low-carbon, resilient, ecomobile, biodiverse, resource-efficient and productive, healthy and happy, with a green economy and smart infrastructure"[10]. This appears as another contravention of an agreement, and incidence of greenwashing by Montreal.

8. Transport

The transport system for this development seems to be centered on the Réseau Électrique Métropolitain (REM). This project is itself facing major criticism. A key factor of transport is travel duration, which is exacerbated by the REM's poor interconnection with the existing transport

network. The table below shows the average travel times for each leg of a journey to or from a typical Cap Nature home, using public transit.

Trip Elements	Rush Hour (minutes)	Off Peak
Walk to Bus	7	7
Wait for Bus	10	15
Bus Ride	15	15
Wait for REM	5	12
REM Ride	35	35
Transfer Time	10	10
Wait for Metro	2	5
Metro Ride	10	10
Walk to Destination	10	10
Total	100	119

(The assumptions are as follows:

- Wait for bus may be less going downtown since one can time to a schedule, but the reverse direction is not possible to time, so a longer wait is necessary.
- Wait for REM in off peak- not specified by CDPQINFRA.
- Most people's destination is not within walking distance of Central Station so they require transfer to the Metro or bus to complete journey
- Transfer time at Central Station as measured by Radio Canada. New transfer stations will take many years, if ever, to complete.
- Hybrid method of accessing REM by auto removes 17 or 22 minutes, but adds traffic jams and parking lot logistics and complexities so it is not considered here)

The total time of the commute is over an hour and a half at rush hour, and two hours at off peak times. It is not practical to commute for 3 or 4 hours a day, so many will instead opt for their automobile. Furthermore, the REM being controversial, it is not necessarily guaranteed to be implemented without major modifications, if at all. In either of these cases, it can be expected that there will be a massive increase in automobile traffic. The proposed north to south Urban Boulevard is a great idea except for the fact that it doesn't go anywhere. It would connect to the westbound TransCanada service road, not a great choice for a downtown destination. If on the other hand an overpass would be built sometime in the future, then it will dump the thousands of cars onto the currently badly congested TransCanada highway, leading in turn to the Decarie Circle congestion. This is not a viable transportation plan, and without a viable transportation plan, the whole development may not be viable in this location.

9. Alternatives

If one were to optimize the conservation /development factors in this project, then given all of the issues discussed above, a small amount of development could be allowed along the Boulevard Gouin corridor, as long as only a few trees were cut. The infrastructure is existing, and transportation needs only minor improvement. The majority of the proposed project (around 90%) would remain as protected greenspace. Alternate building sites have been identified in central and eastern Pierrefonds-Roxboro that could accommodate around 1200 units. These sites are near the AMT train stations (Transit Oriented Development), and City Hall. [11] The study was restricted to this area, and surely many more possible sites could be identified just on the West Island.

As a general principle, in order to minimize destruction of ecosystems and its negative effects, development should be located on brownfield sites. This is comprised of mostly vacant lots, or derelict and abandoned buildings and industrial sites. Removing greenspaces does not improve the city, quite the opposite, but rehabilitating a brownfield site does represent an improvement. Development on greenspace maximizes the profit for the developer and maximizes the harm to the public. Surely there is an optimum approach. Rehabilitation and redevelopment of a brownfield site is certainly more expensive, but there is still plenty of profit in such a project.

So one must choose between possible sites for development, either greenfield or brownfield . The aftermath of the development process will leave the other one in its original state. Which one would benefit the public better to be left in its original state? Or perhaps in other words, which one would be a liability for the community and which one an asset to be preserved? This:[12]

OR THIS [13]

10. Conclusions

The factors that have been considered impact public health and death, biodiversity, transportation impracticalities, and long term unsustainability. All of these considerations would point to a relocation of the proposed development. Then on top of that come the City's commitments to Biodiversity Conventions, ICLEI, and the PMAD and the Schéma d'aménagement et de développement's 10% conservation target. With all of this in mind, development should not be on the little remaining greenspace that is left on the island, but on other land types such as brownspace*.*

 The city administration claims that it is necessary to implement this project in order to keep families on the island and to ***prevent*** urban sprawl, but as the urban environment degrades, families will flee the city in search of a better and healthier location. It is by improving the environment and providing parks and greenspaces that families will be enticed to stay**.** We are also reminded by

politicians and developers that there is a given right to develop and any encroachment on that right is grounds for a lawsuit, but this is not quite correct. Jurisprudence would seem to say that a permit need not be issued if it is not deemed to be in the public interest.

So it is really simple: cutting down trees and destroying greenspace results in increased sickness and death, and reduced quality of life. So when the city allows trees to be cut, and greenspace to be destroyed, it is pandering to the developer, and is directly going against the interests of the public. Do the interests of a developer to generate profit take precedence over the health and menace of deadly illness of the public?

This project is not consistent with the environmental and strategic interests of the public nor the City's stated objectives and commitments, and therefore needs to be built somewhere else, if at all, with a more ecologically sensitive planning process.

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