

ONTARIO MUNICIPAL BOARD
Appeal of City of Ottawa OPA 77

AFFIDAVIT

I, Darlene Conway, P. Eng., of Ottawa, **MAKE OATH AND SAY:**

1. That my residence is located in Ottawa at the municipal address known as 291 Duncairn Avenue, ON, K1Z 7H1, e-mail address []
2. I am a Professional Engineer, as designated by Professional Engineers Ontario. I have 21 years of experience in water resources and municipal engineering, in both the public and private sectors. I am currently employed by the City of Ottawa and have been since 2002, but provide this affidavit as a private citizen. A copy of my Curriculum Vitae is included as **Exhibit A**.
3. That I have been asked and have agreed to give expert testimony on behalf of the appellant, Friends of the Greenspace Alliance, with respect to floodplain and stormwater management matters (Issues 3 and 4). I have prepared a Witness Statement that has been filed with the OMB.
4. That I have reviewed the affidavit of Mr. John Riddell, P. Eng., dated November 16, 2009, prepared in support of the Motion for Dismissal of the subject case without a hearing.
5. That I disagree with the positions taken by Mr. Riddell in this matter, in particular as related to stormwater and floodplain management issues dealt with in the Environmental Management Plan (Novatech Engineering Consultants Ltd., June 2009).
6. That based upon my review of the results made available in the Environmental Management Plan (EMP) which is documented in my witness statement, it is my opinion that the flood levels documented in the EMP are incorrect.
7. That should OPA 77 proceed as currently proposed, flood levels in the Carp River would be expected to rise, increasing flood risk to the already flood-prone community of Glen Cairn and negatively impacting downstream lands. This is inconsistent with the Provincial Policy Statement (PPS) which states,

“1.1.1 Healthy, liveable and safe communities are sustained by: a) avoiding development and land use patterns which may cause environmental or public health and safety concerns.”

8. Further, my conclusions regarding the incorrect flood levels documented in the EMP have been confirmed by an e-mail dated November 16, 2009 from legal counsel for the City of Ottawa (**Exhibit B**) which indicates that the Fernbank consultant has acknowledged an error in the modeling. From the e-mail:

“We can advise you that Novatech has determined that 50 year hydrographs were mistakenly used in the final draft as approved by city council (an administrative error was made attaching an incorrect file).”

The resultant effect of this reported error would be that lower (50 year) flood levels have been represented as 100 year flood levels in the EMP.

9. Accordingly, the modeling results documented in the EMP cannot be used to demonstrate the adequacy of the proposed stormwater management (SWM) quantity control criterion, nor confirm that OPA 77 will not result in increased flood levels and increased flood risk both upstream and downstream of the Fernbank lands.
10. I note that revised flood level results have been documented in Mr. Riddell's witness statement received November 23, 2009, however, my review is based upon the EMP approved by City of Ottawa Council in support of OPA 77.
11. Consequently, I disagree with the positions taken by Mr. Riddell in his affidavit related to stormwater management criteria and flood level impacts In particular:
12. At point 5 of Mr. Riddell's affidavit, he states, *Accordingly, “A key objective of the Environmental Management Plan is to establish stormwater management criteria for the Fernbank community that can be implemented through stormwater site management plans” (EMP, p.54).* At point 6, he further states, *“The Stormwater Criteria set out at section 6.3 of the EMP and section 6.1.1 of the MSS explicitly provide, among other things, that “The proposed development must not result in any increase in downstream flood risk in the Carp River.” The other quantity control criteria are either subject to this criterion or intended to provide additional security that this criterion will be met. When any development application comes forward on the Fernbank*

Lands after the approval of OPA 77 the applicant will need to demonstrate that the stormwater facilities meet these criteria.”

13. The purpose of identifying appropriate stormwater management criteria at a master planning level is to ensure that adequate lands are set aside for the purposes of stormwater management and to provide guidance to individual development applications that will follow. Given the acknowledged error in modeling, the EMP has not confirmed the recommended SWM quantity control criterion is appropriate. This key objective of the EMP has not been met and the EMP can provide no guidance to future development applications in this regard.
14. Further, Mr. Riddell fails to identify all of the SWM criteria noted in the EMP, in particular that, *“The proposed stormwater management strategy will need to adhere to all applicable policies and guidelines of Mississippi Valley Conservation; the City of Ottawa, MOE, and other approvals Agencies”* (EMP, Volume 1, p.55). Hence, the suggestion that the governing or controlling criterion is that, *“the proposed development must not result in any increase in downstream flood **risk** in the Carp River”* (my emphasis) is not correct as it does not adhere to the City’s Stormwater Management Policies which state: *“The City will: Require the implementation of stormwater management measures, where required, that will ensure no increase in the regulatory **flood elevation** resulting from changes in land use”* (my emphasis). (A copy of the City of Ottawa Council-approved Stormwater Management Policies is provided in my witness statement.) The distinction is important in that increases in flood levels (or flood elevations), regardless of whether there is any attendant increase in flood risk, can encumber private property upstream and downstream of the development.
15. At point 9 in Mr. Riddell’s affidavit, he states,
“The EMP and MSS specifically provide a mechanism for amendment should implementing its recommendations, including the stormwater criteria, not be feasible, or should circumstances change.” Minor” changes do not require a change to the EMP or MSS, but “major” changes require an addendum pursuant to the Municipal Class EA. What this will mean in practice is that if new facts come forward or circumstances arise that affect the matters on which the EMP and MSS are based, including any change to the hydraulic or hydrologic model, which results in the detailed design of any stormwater facility not being able to meet the stormwater criteria, including the “no increase in downstream flood risk” criterion, then the EMP/MSS

must be amended, as per the stated process (EMP, Section 14.1, MSS, Section 12.1)."

16. It is my opinion that the acknowledged error in the modeling represents a "major " change: the flood levels documented in the EMP are not accurate and hence, the EMP has not demonstrated that the proposed quantity control criterion is appropriate. By the EMP's own mechanism to address "major" changes, at minimum, an addendum pursuant to the Municipal Class EA is required.

17. At point 10 in Mr, Riddell's affidavit, he states,
"The Notice of Appeal of the Friends of the Greenspace Alliance (the "Notice of Appeal") states "The elevation flood levels will be increased by the implementation of the Fernbank CDP." I am not aware of any study which substantiates that statement."

I submit that the documentation available in the EMP itself substantiates that flood levels would be expected to rise if OPA 77 proceeds as currently proposed. This is confirmed by my review of the consultant's own hard copy modeling results made available in the EMP which is provided in my witness statement.

18. At point 11 in Mr, Riddell's affidavit, he states,
The Notice of Appeal appears to contemplate that the CDP target: "Ensure that the post-development runoff volume from the Fernbank Lands tributary to the Carp River does not exceed an additional 40,000 m³ above existing conditions for the 100 year event." Allows one to conclude as follows: "thus the additional flow of 40,000 cubic meters (sic) above existing conditions constitutes a significant degradation, contrary to earlier testimony that the flood levels would be reduced over existing conditions."

"In my opinion this conclusion cannot be drawn from the stormwater target referred to. Run-off is the input into the designed stormwater system. Any impact on a receiving watercourse like the Carp River depends on the output of that system, after storage, infiltration and evapotranspiration. Urban development generally raises run-off volumes. In this case we calculated that the additional volume of run-off resulting from development in accordance with the CDP over the course on (sic) an entire design storm event (12 hours) would be approximately 30,000 cubic metres. We have subsequently determined that due to an administrative error attaching incorrect schedules the correct calculation is approximately 35,000 cubic metres. The 3rd party reviewer, looking at the Fernbank Lands, determined

that even at 40,000 cubic metres of additional run-off it (sic) could conclude that the criterion of no increase in downstream flood level could be met.

19. As documented in my witness statement, there is no indication in the Third Party Review - Carp River Restoration Plan (Greenland, March 2009) that any hydraulic modeling analysis using standardized methodologies was actually done (for the Third Party Review) with Fernbank's post-development hydrographs to confirm that 40,000m³ of excess runoff volume following development would not increase existing condition flood levels based on the quantity control criterion assumed by the Fernbank proponents. It is my opinion that the conclusion (from the Notice of Appeal) *"thus the additional flow of 40,000 cubic meters (sic) above existing conditions constitutes a significant degradation, contrary to earlier testimony that the flood levels would be reduced over existing conditions"* can, in fact, be drawn. The recommended quantity control criterion has never been demonstrated to be appropriate in previous studies and would be expected to result in increased flood levels should OPA 77 proceed on the basis of that criterion.

20. At point 17 in Mr. Riddell's affidavit, he states,

"Witnesses for the Appellants have raised the concern that the 40,000 cubic metric (sic) criteria in the CDP, derived from the Third Party Review, has not been adhered to. They compare the 226,000 figure to the 300,000 figure found in the EMP and conclude that the additional run-off is 75,000....." At point 18, he continues, *"The 300,000 figure in the EMP is based on a SWMHYMO model, with inputs corrected to reflect updated information now available based on the detailed design at the Granite Ridge Subdivision which contributes to the same hydrographs as the Fernbank lands, as well as updated soils and topographic data obtained during the existing conditions analysis of the Fernbank lands, which also have an impact on the compute run-off volumes. The corrections are documented in the EMP (EMP, p.46). Thus at the outset, the methodology employed by the Appellant's witnesses attempts to take a difference between figures which are not directly comparable, without making any adjustments. In my opinion this significantly limits the usefulness of the exercise."*

21. The significance of the additional 75,000m³ of additional runoff from the Fernbank lands is explained in detail at point 36 of my witness statement. In general terms, this discrepancy highlights the failure to plan this area *"... using the watershed as the ecologically meaningful scale for planning;"* as required by the PPS. Revising baseline conditions as individual planning areas proceed – as OPA 77 proposes to do – rather than working from a

consistent “existing condition” on a subwatershed basis, results in flood levels becoming a “moving target.” Should every future development choose to similarly increase existing condition runoff volumes, then flood levels would inevitably rise even more than already documented in the TPR. The PPS requires, that “*development shall generally be directed to areas outside of hazardous lands adjacent to river, stream and small inland lake systems which are impacted by flooding hazards.....*” Failing to manage the cumulative impacts of development on existing condition flood levels, by “... *using the watershed as the ecologically meaningful scale for planning;*” can create new hazards to existing development (i.e., flood level increases) as the subwatershed builds out, effectively defeating the intent of the PPS’ natural hazards policies. This inconsistency in existing condition runoff volumes and flood levels explicitly demonstrates why the impacts of OPA 77 should have been accounted for and coordinated with the planning for Kanata West and all other lands slated for development in the subwatershed.

22. Further, while it is recognized that drainage area boundaries internal to the Fernbank lands were revised in the EMP based upon additional topographic information, the total drainage area in the EMP (407.2 ha) to the point of interest (location 43966) did not significantly change over the comparable drainage area (402.2ha) in the TPR (EMP, p.46). Hence, to avoid the problem of cumulative impacts, the Fernbank existing condition modeling should at least have been adjusted or calibrated to achieve the same total runoff volume (226,000 m³) as the TPR at this location. This would have ensured a consistent baseline condition against which to assess the impacts of developing Fernbank. This was not done.

23. At point 17 in Mr, Riddell’s affidavit, he states,

“For the purposes of the matters before the Board, it is insignificant that the total future run-off calculated by Novatech is approximately 75,000 cubic metres higher than the existing run-off figure utilized in the 3rd Party Review for the following reasons:

- a) *It has no impact on downstream flood risk, the controlling criterion in that regard continues to apply;*
- b) *The existing runoff figure was used in the Third Party Review to frame the argument that planning level conditions could be set for the interim without having a fully calibrated model of the future conditions with the knowledge that there was additional conservatism in the Volumetric Analysis; and*

c) *The differential between the cubic metre calculation and the 40,000 cubic metre criterion is 35,000 cubic metres, which considered in the context of flood volumes of 1.27 to 1.44 million cubic metres is not significant to this planning level analysis.*

24. In my opinion, the above statements are not relevant. With respect to a) there has been no reviewed and Council-approved analysis completed to date that demonstrates “no impact on downstream flood risk.” Rather, the results documented in the EMP have been acknowledged to be erroneous. It is my opinion that flood levels would be expected to rise should OPA 77 proceed as currently proposed. The statements in b) and c) are not relevant when the EMP has failed to accurately document the impacts of development on flood levels in the Carp River. Statement c) also fails to acknowledge the need to properly manage the cumulative impacts of development.

25. At point 22 in Mr, Riddell’s affidavit, he quotes,
“Issue 4 in the Notice of Appeal reads as follows:

4) Inconsistent SWM standards applied in the implementation of the Fernbank CDP

Runoff from the Fernbank development into the Carp River (under the jurisdiction of the MVCA is to be controlled for rainfall events only up to the 10-year event. This is somewhat inconsistent with the requirement for the portion of the Fernbank development that drains to the Jock River (under the jurisdiction of the RVCA), where the appropriate standard is to be applied, namely, to control up to the 100 year event. Such a planning approach simply makes no sense which cannot and should not be accepted as a responsible and sustainable planning practice.”

26. At point 22 in Mr, Riddell’s affidavit, he states,

“In my opinion, this issue is irrelevant because the stormwater criteria in both the EMP and MSS make this criteria subject to the controlling criteria of no increase in downstream flood risk. In fact, based on the modelling we have done to date it seems likely that the imposition of quantity control to pre-development levels only to the 10 year storm for stormwater ponds within the Fernbank Lands which drain directly to the Carp River will result in less impact on downstream flood elevations than control to the 100 year storm. In any event, consistency with a standard applied in a different watershed has little, if any, value. One has to examine the criteria for that watershed and consider the dynamic nature of the flows.”

27. As noted previously, the error in the modeling supporting OPA 77 was acknowledged on November 16, 2009 (**Exhibit B**), the same day the motion for dismissal, appending Mr. Riddell's affidavit, was served. Given the acknowledgement of the error, in my opinion, there is no basis for the statement that, "*it seems likely that the imposition of quantity control to pre-development levels only to the 10 year storm for stormwater ponds within the Fernbank Lands which drain directly to the Carp River will result in less impact on downstream flood elevations than control to the 100 year storm.*"
28. Given that "*A key objective of the Environmental Management Plan is to establish stormwater management criteria for the Fernbank community that can be implemented through stormwater site management plans*" (at point 5 of Mr. Riddell's affidavit), it is concerning that the recommended quantity control criterion only "*seems likely*" to result in less impact on flood levels than the more stringent 100 year controls. It is my opinion that the value of the EMP is considerably lessened if it does not fulfill the "*key objective of..... establish[ing] stormwater management criteria...*"
29. Further, there is a key similarity between the Fernbank lands draining to the Jock River watershed and those to the Carp River watershed: both areas are located in the upper (or headwater) area of their respective watersheds – areas that are particularly sensitive to increases in runoff volume resulting from development. It is commonplace, if not standard, in such areas to implement quantity controls up to and including the 100 year event. Hence, in my opinion, it was completely relevant to raise the concern in the Notice of Appeal that an unconventional or lower standard for quantity control was applied to the lands draining to the Carp River watershed.
30. Further, I am in complete agreement with Mr. Riddell's statement at point 22 that, "*One has to examine the criteria for that watershed and consider the dynamic nature of the flows.* As documented in my witness statement, this examination of quantity control criteria, however, has never been completed for the Carp River watershed taking into account the Fernbank lands in a developed condition. In other words, appropriate SWM quantity control criteria have never been developed on a subwatershed basis, making this aspect of the EMP inconsistent with the PPS which calls for Planning authorities to, "*protect, improve or restore the quality and quantity of water by: a) using the watershed as the ecologically meaningful scale for planning;*"
31. At point 25 in Mr. Riddell's affidavit, he states,

The question of flooding in the Glen Cairn community has been considered by Ottawa Council and it has directed further study. This process is only just commencing. The Glen Cairn community is not within the geographic boundaries of OPA 77. The Glen Cairn stormwater pond is within the geographic boundary of OPA 77, but as a long-completed undertaking it was not considered in the EMP or the MSS as it was not a project for which approval was sought.

32. As documented in my witness statement, any increase in flood levels downstream of the Glen Cairn SWM facility would be expected to result in increased flood risk to the already flood-prone Glen Cairn community. Given identified problems with existing 100 year water levels in the Glen Cairn pond, existing flood risks to this community, and the need to avoid any flood level increases downstream in future, it would be premature and present unacceptable risk to allow Fernbank to proceed independently of a comprehensive solution as determined by the flooding investigation.
33. In summary, there are acknowledged errors in the modeling used to support OPA 77. Proceeding with OPA 77 as currently proposed would be expected to result in increased flood levels in the Carp River that will increase risks to public health and safety.

SWORN BEFORE ME)

at the City of OTTAWA)
in the Province of Ontario)
this 26th day of November, 2009)

A Commissioner for taking Affidavits