

## Ontario Municipal Board

IN THE MATTER OF an appeal by Friends of the Greenspace Alliance

### Reply Witness Statement of Darlene Conway, P. Eng. December 7th, 2009

1. I am a Professional Engineer, as designated by Professional Engineers Ontario. I am employed as a Senior Project Manager in the Infrastructure Services and Community Sustainability Department of the City of Ottawa. I have been employed by the City of Ottawa since 2002, but provide this testimony as a private citizen. I have 21 years of experience in water resources and municipal engineering, both in the public and private sectors. I have extensive experience in the management of or participation in a wide range of planning and environmental assessment projects in support of the City's Official Plan updates, Community Design Plans, and other master planning exercises.
2. I have reviewed the witness statement of Don Moss, P. Eng., and the joint witness statement of John Riddell, P. Eng. and Michael Petepiece, P. Eng.
3. I do not agree with their positions related to the adequacy of stormwater management (SWM) criteria proposed in the June 2009 EMP and subsequent model corrections outlined in the witness statement of Mssrs. Riddell/Petepiece.
4. My opinion in this matter is based upon my review of the hydrologic/hydraulic modeling supporting OPA 77 that was received from the respondent on November 25<sup>th</sup>, 2009, subsequent to the filing of my witness statement and approximately one month following the initial request for the modeling. From a review of this modeling, it is apparent there are significant inconsistencies between how the existing and post-development conditions have been modeled that bring into question the use of this modeling for assessing the impacts of development on flood levels and hence, the ability to determine effective SWM criteria.
5. The inconsistencies relate to considerable differences in Manning's 'n' (roughness) values assigned in the existing and post-development conditions of the Carp River.

6. The Manning's 'n' value is a reflection of how "rough" the channel and floodplain of the Carp River is. Higher roughness values generally result in higher flood levels. For example, a floodplain covered with shrubs and trees would generally have higher flood elevations than an equivalent floodplain covered with grasses or pasture, as the trees and shrubs provide greater resistance to the passage of flood flows.
7. The existing Carp River floodplain is generally bereft of any significant riparian vegetation (see **Exhibit A**). However, in the modeling received from the respondent, the Manning's n values are considerably higher under existing conditions (in most locations in the urban area of the reach) than they are in post-development conditions. This approach has resulted in a considerable underestimation of the impacts of the development of Kanata West, the Carp River restoration and Fernbank on existing condition flood levels which undermines the recommendations in the June 2009 EMP and subsequent model corrections outlined in the witness statement of Mssrs. Riddell/Petepiece.
8. Further, given that both the proposed Carp River restoration and OPA 77 identify considerable increases in riparian plantings on their respective reaches of the river (see **Exhibit B**, Figure 5.1.2(a) from the Carp River, Poole Creek and Feedmill Creek Restoration Class Environmental Assessment, (TSH, June 2006) and Appendix L in the June 2009 EMP, Volume 2), roughness values should generally be greater in the post-development condition, not equivalent or reduced.
9. For the purposes of illustrating the magnitude of impact of Manning's n values on flood levels, the reduced values in the respondent's post-development condition model have generally been applied to the existing condition model, while the higher existing condition 'n' values have been applied to the post-development model. While this exercise is only intended to show the sensitivity of flood levels to 'n' values and does not necessarily reflect the actual post-development condition proposed for the Carp River floodplain, it is nevertheless more appropriate than assuming that post-development 'n' values will generally be considerably lower than existing conditions. This exercise considered full development of the Fernbank and Kanata West lands.
10. The results of this exercise are provided in **Exhibit C**. As indicated, the resultant flood level increases over existing conditions (when both Fernbank and Kanata West are fully developed and the Carp River restoration is in place) are 9cm at the Glen Cairn SWM facility up to a high of 48cm at Palladium Drive. Peak flow increases (on a percentage basis) range from a 4% increase at Hazeldean Road to a high of 19% at Palladium Drive.

11. Such flood level and peak flow increases would represent considerable increased flood risk and/or the encumbering of private property to the already floodprone Glen Cairn community, the existing development within the Kanata West area, and the Highway 417 crossings of the Carp River. Allowing development to proceed that could result in such impacts would clearly be 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.”*
12. In my opinion, the use of the current version of the respondent’s modeling (the Third Party Review “model of record”) is inappropriate as it does not adequately reflect the existing and post-development floodplain conditions. Such significant impacts as demonstrated by the exercise provided in **Exhibit C** are not acceptable, even at a “planning level” (as has been emphasized by the respondent’s witnesses), and should be addressed with a revised Carp River Restoration plan that adequately accounts for the differences between pre and post-development roughness of the river and its floodplain.
13. Until such time as the Third Party Review/Kanata West modeling is revised to appropriately reflect and account for the pre and post-development roughness values, it is premature for OPA 77 to proceed. The Class Environmental Assessments for the Kanata West lands and Carp River restoration remain to be re-posted and will be subject to Part II Order requests. The Glen Cairn flooding investigation is getting underway and may result in further impacts or changes to the Carp River to alleviate the existing flood susceptibility in that community. With so many factors at play and identified inconsistencies in the modeling completed to date, it is essential that the analyses for all of these works - Kanata West, Fernbank, Glen Cairn - be coordinated and not proceed independently of each other.
14. Rather, as the Carp River modeling should, once again, be revised, the Fernbank lands should be incorporated in a developed condition such that the cumulative impacts of all development in the upper watershed can be accounted for at once. Since the required modeling revisions could conceivably result in changes to the stormwater management approach and restoration design in Kanata West, the SWM criteria for Fernbank need to be assessed in the same analysis to ensure the timing effects of all SWM measures and changes to the existing channel and floodplain are accounted for.
15. Since at least 1993, when the Province published a number of guidance documents regarding various aspects of watershed management and watershed planning, the Province has recognized the importance and

validity of planning on a watershed basis. In one of those documents, Watershed Management on a Watershed Basis; Implementing an Ecosystem Approach (MOE, MNR, 1993), it is noted on p. 22 (**Exhibit D**) :  
*“It is wrong to assume that the adverse effects of human activity can always be eliminated or rendered ecologically insignificant through mitigation, regardless of how costly the measure or how good the intention. **Such measures cannot replace good planning** -- better and earlier environmental considerations in land use decisions. (emphasis added)*

16. Flooding is a natural hazard that can be avoided with “good planning” before land use change occurs. In the case of flood-related natural hazards, “good planning” requires using “.....*the watershed as the ecologically meaningful scale for planning*” as indicated by the PPS - which has yet to fully occur for development proposed in the upper Carp River watershed.
17. Further, the respondent previously and explicitly acknowledged that SWM criteria for the Fernbank lands could not be determined independently of the modeling work completed for the downstream Kanata West lands when that modeling was undergoing significant review and revision. This was specifically noted in the City staff report for OPA 77: <http://ottawa.ca/calendar/ottawa/citycouncil/occ/2009/06-24/pec/4%20-%20ACS2009-ICS-PGM-0079-%20Fernbank.htm>

*“May 27, 2009 – Council approved The Third Party Review of the Carp River Restoration. The Fernbank Community Design Plan process was delayed until the Third Party Review was completed as approximately one third of the Fernbank site drains into the Carp River and **the results of the Review were required to determine the flow requirements from the Fernbank Community.**” (emphasis added)*

Now that additional inconsistencies have been identified with the Kanata West/Carp River modeling, and a major flooding investigation is proceeding directly upstream, it is evident that OPA 77 should not proceed independently as if in a vacuum.

18. Specifically, with respect to the witness statement of Mr. Moss, he notes in point 5 that, *“During the third party review process in October 2008, Greenland reviewed an excerpt from a draft EMP for the Fernbank lands. Recognizing that this was still a planning level exercise and there was an active review process ongoing with several agencies and City departments, Greenland felt it was more important to describe the set of conditions or targets that could be adhered to in order to meet the recommendations being made for the watershed. Whatever development that would come out of the review process would have to meet these targets. The 40,000m<sup>3</sup> future increase in runoff with development would be consistent with the volume being modeled elsewhere in the prorated areally (ie Kanata West, 144,500m<sup>3</sup>).*

*This 40,000m<sup>3</sup> volume that has been assigned to planning decisions for the Fernbank lands is also applied to the deficit volume to be included with any development in the adaptive management measures being applied. This feature along with the matching of the existing condition peak flows identified in the existing conditions hydrology model ensures that flood levels should not increase." (emphasis added)*

19. In point 6, Mr. Moss then acknowledges that in, "*Table 3.6.....There are several locations where the future water level is higher than the water level generated in the existing conditions model.*" In my opinion, this appears to be an acknowledgement that the SWM criteria applied to Kanata West (the same as proposed for OPA 77) have contributed to increased flood levels. It is therefore not clear how it can be assumed that the suggested targets for OPA 77 (based on the same assumptions as Kanata West) will, as Mr. Moss indicates in point 5, "*ensure[s] that flood levels should not increase.*"
  
20. Further in point 6, Mr. Moss indicates that, "*The Fernbank lands are to be developed with no increase in flood levels recorded in Table 3.6. The design of the future Carp River corridor will be modified to include a permanent widening of 21,400m<sup>3</sup>. This is a City staff recommendation approved by City Council with the approval of the Third Party Review in May 2009. Therefore, the actual water levels recorded in Table 3.6 will change with this design change. The Fernbank EMP is a planning level exercise that has been designed to adapt with the changes as this process evolves.*"
  
21. In my opinion, the problems identified above with the application of reduced roughness values for most of the post-development floodplain invalidate the flood levels documented in Table 3.6. It is also my opinion that "an ever adapting process" will result in a moving target for existing condition flood levels making it difficult, if not impossible, to manage cumulative impacts as developments build out, raising the potential for increased risks to public health and safety.
  
22. In point 7, Mr. Moss states that, "*The City has determined the EMP is a planning level exercise. The appropriate place to ensure that there is no increase in flood risk is with the applications that come forward for development.*" I disagree with this position as did the City when it delayed the completion of the supporting studies for OPA 77 until the Third Party Review was complete as noted above. This position is inconsistent with the need to plan on a watershed basis.
  
23. In conclusion, the inconsistencies in the modeling used to support OPA 77 require revision to ensure that the impact of development on existing

condition flood levels is accurately reflected and subsequently, that effective mitigating measures can be recommended that will ensure no increased risk to public health and safety as development proceeds. The modeling, Carp River restoration plan, and proposed SWM criteria all need to be revisited in a coordinated fashion accounting for full development in the upper Carp River watershed. OPA 77 should not proceed until such time as these matters are resolved.