Comments on Carp River Third Party Review

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"It's not an exact science," said Alf Warkentin. "Some people think it's like having a jar you can put under a microscope to analyze it precisely. This is not chemistry. This is not exact quantum physics here. This is a world we're dealing with that has a lot of unknowns."

> Globe and Mail, April 18, 2009 - Manitoba's chief flood forecaster's response to criticism of inconsistent flood predictions of Red River flood levels. "A long crest, saturated soils, unprecedented ice cover and rapid spring melt-off have all conspired against any attempt to read the river."

"We were never told it would get this high until the last minute…I can't do this again, I just can't… We barely even noticed 2006 here [t]his is getting closer to 1997."

> Darlene Santos, homeowner affected by Red River floods, commenting on flood charts that she knows to be wrong. "Yesterday, those daily charts showed that river levels around Ms. Santos's house were still below those of 2006, a figure she knows to be wrong… In [1997], during the Flood of the Century, the river engulfed the family's 6,000-square-foot home. A line two feet up her fridge still shows the high-water mark.

As I sit here reviewing the Carp River Third Party Review, flood forecasters in Manitoba are busily collecting information to feed into their flood forecasting models in an effort to guide work crews and anxious homeowners protect against the forces of the Red River. Some homeowners, after enduring three floods in the last decade have had enough, and say they are moving.

I believe there is a lesson the City of Ottawa can learn from this real life incident that has not fully played itself out. Is the City of Ottawa desperately running out of developable land to the extent that planners need to direct new development into flood vulnerable areas? and to become reliant on a complicated implementation plan involving collection of field information, limiting development to 34% (whatever that means), and implementing an unproven rain barrel program, all under the guidance of water resources engineers fine-tuning their models to let everyone know when it is safe to reclaim 28 ha of the Carp River floodplain for development?

Such is not the approach to floodplain management in Ontario advocated by the Ministry of Natural Resources. Ontario's approach is to direct new development away from flood hazard areas. The MNR Technical Guidelines state:

The management of flood susceptible lands involves a combination of three main program components:

i) Prevention, by land use planning and regulation of development;
ii) Protection, by applying structural and non-structural measures and acquisition; and
iii) Emergency response, by flood forecasting/warning and flood/erosion disaster relief.

Over the long-term prevention is the preferred method for the management of flood plain lands [emphasis added].

My comments on the Third Party Review have been organized into three parts:

1) Third Party Review Process
2) Technical Review
3) Policy Review
4) Legal Review
5) Conclusion

It is unfortunate that the City has only allowed a ten-day review period (including 4 days over the Easter holiday) in which comments on a very technical 123 page document can be made. As a result, I have had to limit myself to a comparatively high-level review.

Part 1 – Third Party Review Process

For a Third Party Review to be truly independent, there is an underlying requirement for the process to be transparent, and responsive to concerns raised during the process. Such is not the case with the Third Party Review.

The process got off to a bad start on June 24, 2008 when delegations brought their concerns about the Terms of Reference to the Planning & Environment Committee, and essentially no meaningful changes to the Terms of Reference resulted from public input, that included comments by the two Professional Engineers who discovered the errors with the modeling that led the City to undertake the Third Party Review. The only change that provided at least the appearance that the public was listened to was the need for the TPR consultant to meet with the parties who filed Part II Order Requests.

It is noted that the following statement appeared in the Auditor General's media release concerning his audit:

> "Based on legal advice, the results of audit work concerning the Glen Cairn development are not included in the report."

One of the prevalent concerns of the public was their desire that flooding incidents like those experienced in Glen Cairn in 1996 and 2002 would not be repeated. During the PEC meeting Committee members posed questions to City Staff who responded in generalities about potential liability if flooding should result. Staff chose not to inform Committee that the City was just in Superior Court on May 22, 2008 concerning the 2002 flood of Glen Cairn.

The City's position in Superior Court that day should have been factored into the review undertaken by the TPR consultant. Instead, by not disclosing anything about the City's position concerning the 2002 flood, the TPR consultant embarked on a study apparently oblivious to the factors the City had determined were responsible for the flooding incidents in Glen Cairn in 1996 and 2002. By the time the TPR was completed in April 2009, the Superior Court Decision had been released on January 15, 2009. As it turns out some of the key technical decisions made in the TPR (discussed in Part 2 of this submission) appear to be at odds with the position taken by the City in its defence against the 2002 Class Action lawsuit. These factors include the critical design storm for an urban watershed used in calculating the 100-year flood flows, and the need to consider all urbanization in a watershed while computing flood flows.

Heading the list of concerns raised by members of the public and PEC was the policy basis on which the development of 28 Ha of floodplain was proceeding in conjunction with the Carp River Restoration Plan. The following excerpt from the Minutes of the meeting provides context:

> In response to questions from Councillor Cullen, Mr. Mackay stated that a full provincial policy review is not necessary and would involve up to 11 policy documents. Mr. Perks added that the Terms of Reference must be focused on the results and the implications, if any, of the corrected

> modeling of the plan. He reiterated that the Ministry of Natural Resources (MNR) and MVCA are fully behind the application of the floodplain policy in this case. He suggested the two-zone concept is underlining the whole project and is embedded in the Terms of Reference. Mr. Lalonde confirmed that his audit recommended a review of floodplain policy by the City.

If the Terms of Reference underlining the whole project was Two Zone floodplain policy, there appears to be a transparency problem with the process, if the TPR could result in the following conclusions/recommendations:

- The City of Ottawa's intended two-zone flood plain policy is only to be applied in specific areas with existing development with particular emphasis not to create additional building lots.

- The MVC has proposed a modified one-zone policy to be applied to the Carp River corridor forming the Restoration Plan. Correspondence from MNR has referred to the Carp River proposal as a modified one-zone application. Once the Restoration Plan is completed and new flood plain mapping incorporated, MVC intends to reinstate a one-zone policy for this area.

Given that "modified one-zone" policy appears to be the basis on which the floodplain development is to proceed, it is difficult to reconcile Mr. Perks' response to Committee on June 24, 2008 with what transpired through the TPR process. Furthermore, given the fundamental change in floodplain policy underlining the TPR (to a policy that is in neither the PPS nor the City's OP), it is puzzling how Mr. Perks could state the following on April 15, 2009 after reviewing the report with the above noted conclusions/recommendations:

> "As a member of the Project Advisory Committee for the 3rd Party Review of the Carp River Restoration Plan, I have reviewed the final report prepared by Greenland International Consulting Ltd., and attended the Councilors' and press briefing last week.
>
> - All hydrologic and hydraulic models were assessed and verified for use with the restoration plan.
> - Other aspects of the restoration plan were considered and found to be reasonable.
> - No changes were suggested for the 22 Class EA's.
> - Useful recommendations for implementation of the Restoration Plan were made.
>
> I can support the Consultant's findings and recommendations arising from the 3rd Party Review process."

If Two Zone floodplain policy was "underlining the whole project", and the TPR found that Two Zone policy should only be applied in existing flood prone areas, and no new lots can be created, Mr. Perks should be asked to explain how he could have supported the consultant's findings and recommendations. Furthermore, as a member of the Project Advisory Committee, Mr. Perks should be asked to explain how he allowed the policy basis on which the project is now based to deviate from the Two Zone policy he assured Committee the project was proceeding under.

Meeting with TPR Consultant and Project Advisory Committee

Pursuant to the motion supported by the Planning & Environment Committee, being a Part II Order Requester I had the opportunity to meet with the Project Advisory Committee and TPR consultant on October 6, 2008. As indicated in my attached presentation,

"The Approach to restoring the Carp River raises a variety of issues:

1. Engineering / technical issues;
2. Issues related to Health and Safety, and impacts to private property;
3. Policy / Legislative issues
4. Legal issues
5. Environmental issues

Discussion at the presentation focused on several key issues, including the lack of calibration of the Class EA hydrotechnical models; the importance of adhering to technical guidelines; the lack of a sufficient outlet if the restoration plan is to terminate near Richardson Sideroad (as opposed to downstream of the Village of Carp as per the 1909 OCA Decision involving the Carp River Municipal Drain), and information that can be learned from previous flooding incidents in Glen Cairn.

Specific to Glen Cairn, I offered the following summary of issues:

What is to be learned from Glen Cairn?

- make sure when you are undertaking a channelization project the design accounts for all urban runoff from known upstream development areas;
- projects involving risks to public health and safety and risks to property should not rely on adaptive management because recommendations in reports are forgotten about in large bureaucracies;
- natural hazards to be concerned about along the Carp River include geotechnical conditions;
- if you're completing a channelization project don't allow too much development to encroach into stream corridors otherwise you limit your options in the future should your design prove to be deficient;
- be wary of potential downstream problems when little or no quantity controls are used, and capacity of bridges are enlarged;

- no weight should be given to the fact MVC, MNR or other Provincial Ministries had signed-off on the project – instead Third Party review must confirm compliance with requirements of Technical Guidelines
- public agencies have a responsibility to direct development away from hazardous areas and to apply the precautionary principle because they bear all risks;

I was very disappointed to see that the Third Party Review basically disregarded all of the points raised in my entire presentation. I was particularly surprised to see that none of the lessons learned from the three flooding incidents in Glen Cairn would be considered in any way by the TPR consultant, and that none of the issues brought to the consultant's attention about the insufficient outlet would register in his findings. In my opinion, this raises doubts about the independence of the Third Party Review.

Part 2 - Technical Review

i) Design Storm Selection

I was forwarded a copy of the list of references provided to the TPR Consultant. I noticed that the out-of-town consultant was not provided a copy of the City's Sewer Design Guidelines, which at Section 5.3.3.6 contains the following:

> 5.3.3.6 When to Use Specific Design Storms
>
> *The following is a summary of when to use the various design storms presented herein. When choosing a design storm, the designer should perform a sensitivity analysis using various storms and use the one that is most conservative.*
>
> • ***Chicago Design Storm****:* The Chicago storm is widely used in the Ottawa area with respect to urban drainage. In general, the time step for this type of design storm should not be less than 10 minutes for most urban applications. The duration of the storm should also be chosen carefully, as it will have an impact on the peak flows. In general, the storm's duration should be greater than twice the basin's time of concentration.
>
> • *AES Storm:* The AES storm should be used for urban drainage. Typically, the 30% distribution should be used in design. Similar to the Chicago storm, the time step should not be less than 10 minutes for most urban applications and the storm duration should be grater than twice the basin's time of concentration.
>
> • ***SCS Storm****:* The SCS storms are generally applicable to undeveloped or rural basins where peak flow rates are largely influenced by the total depth of rainfall. The designer should use both the 12-hour and 24-hour storm to see which one has the greater impact.
>
> • *Historical Storms:* Historical storm events are used as an analytical tool in the analysis of existing system to establish how a system may function under extreme events.
>
> (Bold and underlining is my emphasis)

There should be no debate that the Carp River subwatershed area – the area upstream of Richardson Sideroad – will become an urban watershed. As stated in the City's sewer design guidelines, the Chicago Storm is used widely in the Ottawa area when calculating design flows in the urban area. The Design Guidelines also indicate that when using the design storm, the storm's duration should be greater than twice the basin's time of concentration. Furthermore the Design Guidelines state that the SCS Design storm – the design storm distribution selected by the TPR consultant, is generally used in undeveloped or rural watersheds.

It is therefore surprising to read the Design Storm Selection discussion in Section 6.6 of the TPR, which evaluated flood levels resulting from the 12 hour SCS Design Storm, the 1 hour AES Storm, and the 4 Hour Chicago Storm.

Table 2.3 of the TPR summarizes the time of concentration for the catchments. The noted time of concentration to the Glen Cairn Pond is 333 minutes (5.5 hours). The Time of Concentration to Richardson Sideroad could add another 1-2 hours to the time of concentration at the Glen Cairn Pond. Therefore, if the City's design guidelines require the Time of Concentration to be generally greater than twice the Time of Concentration, how did the TPR consultant decide a 4 Hour Chicago Storm should be used in the analysis?

Furthermore, during the TPR Consultant's review of the CH2M Hill Existing Conditions report, he must have overlooked the following report cited in the List of Reports Reviewed to Support Hydrologic Model Formulation on Page 2-3:

14. Performance Review of Upper Carp River – Glen Cairn, Volumes 1 & 2., March 2003.

Had the TPR Consultant reviewed this document he would have discovered that the City previously found the 24-Hour Chicago Storm to be the critical design storm for the $7 Million flood remediation project there. Given that the Carp River Restoration Project is downstream of Glen Cairn, it is difficult to follow the logic in the selection of a 4-hour Chicago Storm design event – and not a 24-hour Chicago Storm. Furthermore, had the TPR consultant looked into the 2002 Glen Cairn flooding incident after my presentation to the PAC on October 6, 2008, he would have discovered the City's position about the use of the SCS Design storm in an urban watershed.

ii) Double Counting of Flood Storage and Riparian Storage

My comments will start with definitions of what I mean by "Stormwater Storage" and "Riparian Storage".

Stormwater storage is the volume of water required to be detained to avoid increases in peak flows following urbanization / land use change.

Riparian storage is the volume of water that is contained along a river corridor as a result of a rainfall and/or snowmelt runoff event.

Unless the development area drains directly to a major river or lake, "Stormwater Storage" is required to avoid aggravating flood flows in receiving watercourses. Stormwater Storage is usually created through the construction of stormwater management ponds (facilities) that typically regulate runoff discharges to pre-development conditions for all rainfall events up to the 100-year rainfall design event in the City of Ottawa.

In my opinion there are two elements in the stormwater management planning and approach to floodplain management in the Kanata West Class EAs, and now the TPR, that meets with the approval of the MVC, that raise concerns. These two elements are:

1) There has been no credible hydrotechnical analysis completed on the Carp River from which it is possible to conclude no quantity SWM controls are required for events up to the 100-year event; and

2) The position taken by MVC that flood level increases of 10 cm or less are within the accuracy of the computer models and are of no concern is contrary to longstanding policies used by CAs across the Province.

The real effect of these elements of stormwater management planning and approach to floodplain management that contradict conventional methods, are not detected because of the non-calibrated hydrotechnical analysis.

From a regulatory perspective, the Conservation Authorities advise MOE on stormwater management criteria from which approvals under Section 53 of the *Ontario Water Resources Act* are established. In effect, MVC's failure to require the SWM facilities in Kanata West to provide quantity control for rainfall events up to the 100-year event, means that on-line storage along the Carp River corridor is being used for stormwater management to regulate flows to pre-development rates. However, in the TPR, the consultant only tallies one storage volume – the riparian volume.

In effect, the Carp River Restoration Plan constitutes an on-line SWM facility that should require approvals under Section 53 of the *OWRA* and Section 28 of the *Conservation Authorities Act.*

MOE should be satisfied that pre-development flow rates are not increased as a result of urbanization – and that the necessary Stormwater Storage facilities required to achieve this are authorized under the *OWRA*. From a maintenance perspective – and in consideration of climate change, a matter raised in the MOE Minister's Order, the preferred approach to providing Stormwater Storage should be in off-line SWM facilities. This means completely revisiting the design of the major / overland flow systems and development grading plans throughout the Kanata West development area. Similar considerations would also apply to the Fernbank development.

Discussion in the TPR concerning storage volumes should be completely re-written so the reader can distinguish between riparian and stormwater storage volumes. Without making this distinction, it is not possible to determine whether pre-development conditions are actually being maintained, and if the pre-development conditions are not being maintained, whether the change is because there is not enough stormwater storage, or if the riparian storage (i.e. river corridor) is inadequate.

iii) False sense of security – Sept 2004 flood levels less than 1983 FP levels

At page 46, the TPR states the following:

> The Sept 2004 event becomes a more critical event due to the volume of rainfall over a longer duration. Storms of the magnitude of the September 2004 event are quite rare. When reviewing water levels measured during

this event, it is also important to note that the MVC 1983 flood elevation criterion was not exceeded. [emphasis added]

The above noted statement is mixing a number of issues. The September 2004 event certainly represents a critical event because of the runoff volume, and events of this type are rare. However, in a climate change era, storms of such a magnitude may not be as rare as they are presently thought to be.

The flood levels recorded in September 2004 are what they are – the response of the Carp River watershed based on 2004 land use conditions. In 2004 runoff from more than 1000 ha of the watershed was from rural / agricultural lands, that within the current planning horizon, will become urbanized. If the September 2004 event was to reoccur when the rural /agricultural lands become urbanized, the runoff volume and rates would be considerably different. Nowhere in the TPR is that reality acknowledged. Instead, the report projects a sense of security in knowing that the 1983 flood levels were not exceeded. That will not matter when the area builds out, and another storm of that magnitude is experienced.

The MOE Minister asked the City and Kanata West Owners Group to consider the impact of climate change on flood conditions. A reasonable way to respond to the Minister's request would be to model the response of the watershed using land use conditions from the 20-year planning horizon and proposed channelization scheme with the September 2004 rainfall event, and see what happens to flood levels. That would be informative. My engineering judgment tells me that the September 2004 flood levels would prove to be irrelevant when 1000 ha of development is added to the watershed.

iv) Section 8.2.3 Sanitary Servicing EA Projects

The discussion in this section of the TPR focuses only on one aspect of issues related to wastewater pump stations and flood elevations of rivers and streams. Sure the design of the sanitary sewer system needs to ensure the hydraulic gradeline of the system under design conditions does not result in basement flooding. Efficient design is complicated by a number of factors, not the least of which is the starting elevation from which the HGL is calculated – and the grading constraints posed by the local topography.

However, the designer also has to be wary of what could go wrong should flood levels rise to an elevation that the pump station becomes flooded, as was the case in North Kanata in September 2004 with the flooding of the March Pumpstation by the Kizell Drain. This incident has resulted in another Class Action lawsuit filed against the City of Ottawa.

Because pump stations can be vulnerable during floods, the proposed implementation plan presents a problem for the designers of the Kanata West pump station. It will likely take five years to bring such a facility into service. There has to be certainty in the flood elevation from which the design of the facility is to be based. When such an investment is being made, there should not be any surprises when results finally trickle from the model calibration / adaptive management

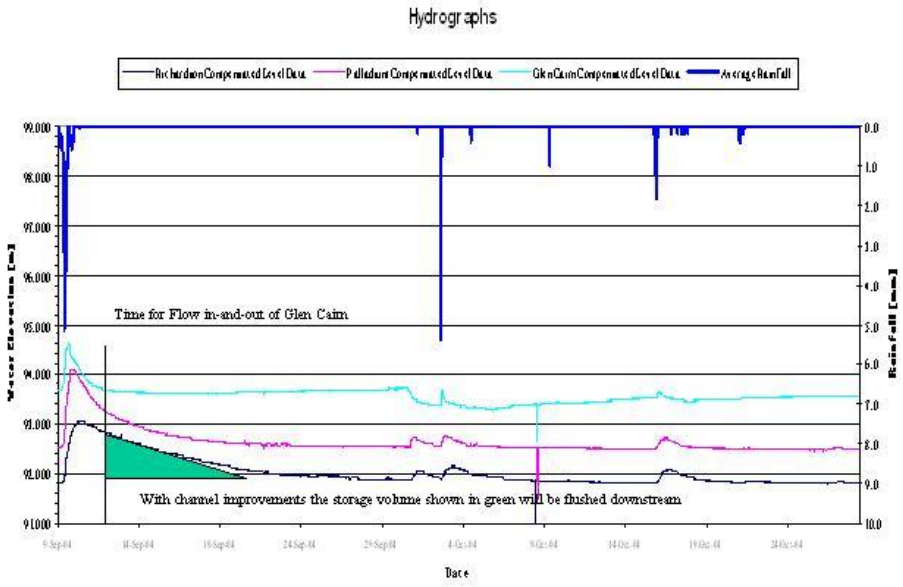
process, only to find the station has been designed on the basis of the wrong flood elevation.

v) HEC RAS Modeling results all presuppose sufficient outlet

The entire basis of the non-calibrated modeling results is that free-flowing conditions exist downstream of Richardson Sideroad, when such is not the case. The TPR's suggestion that a "worst case" condition can be quantified, before an attempt at calibrating the model to better represent the sluggish nature of the Carp River downstream of Richardson Sideroad is disingenuous.

The reality is that there is excellent monitoring data available that has not been completely examined in the TPR. The flow monitoring data from September 2004 is very informative – it took less that 2 days for water levels at the Glen Cairn gauge to return to antecedent levels, whereas it took nearly 2 weeks for water levels to return to antecedent conditions at Richardson Sideroad. Irrespective of the fact there is only water level information and not flow data, such information should be factored into the impact assessment.

The issue of sufficient outlet (or lack thereof) formed part of my presentation to the TPR consultant and the PAC. The green triangle in the figure below corresponds to the riparian storage that would need to be displaced downstream, if the restoration plan results in a free flowing condition. If that riparian storage is shifted downstream, the impact on downstream flood levels will be larger than those documented in the TPR. When the increased runoff volume from Kanata West and Fernbank is factored in, the volume will be larger yet, and the flood level increase downstream will be that much more.



vi) Increased flood levels documented in Table 3-6

The flood elevations documented in Table 3-6 show that flood levels will rise about 0.2 – 0.3m in the reach of the Carp River between Hazeldean Road and Palladium Drive. There is existing development in this area, and such a flood level increase raises the following issues:

a) It is illegal to flood private property without a written agreement with the affected property owners, that is normally registered on title;

b) The stormwater management at the Sensplex and at SMART Technologies sites will need to be revised because the existing SWM facilities will not function as design under 100-year flood conditions;

c) Further to b), the Certificates of Approval for the existing SWM facilities at the affected sites will need to be updated, but until issues with the lack of calibration of the Carp River floodplain modeling are resolved, it will not be possible to update the SWM plans/ criteria;

d) The increase in flood levels is evidence that the proposed SWM criteria is not valid, and changes will need to be made such that post-to-pre control of all rainfall events up to the 100-year events is provided;

e) The increase in flood levels is evidence that, without the use of conventional stormwater management measures including SWM facilities constructed on tableland that provide post-to-pre control for all rainfall events up to the 100-year event, Restoration Plan as proposed is functioning as an on-line stormwater management facility that requires approvals under Section 53 of the *Ontario Water Resources Act*;

f) The increase in flood levels is evidence that the approval of Two Zone floodplain policy at 20 Frank Nighbor and 613 Hazeldean Road was premature, and changes are required in the Comprehensive Zoning Bylaw;

g) Urbanization of the upstream Fernbank community could aggravate flood levels in the above noted reach, and before stormwater management criteria are established for the Fernbank community, it will be necessary to update the floodplain modeling to account for changes to the hydrology and hydraulics of the Fernbank community becoming urbanized; and

h) The plan to allow encroachment of development into the One Zone floodplain in Kanata West should be re-thought.

Part 3 – Policy Review

i) MOE Minister's Order

Section 1 of the MOE Minister's Order relates to the Third Party Review. At Section 1.2 the Order, MOE Minister Gerretsen Orders:

> "The City and KWOG shall report back on impacts, if any, of the inconsistencies in the application of one and two-zone floodplain policies and identify what actions the City intends to take to address these impacts, where needed. It is my understanding that such actions could include the City enacting a by-law to apply two-zone floodplain policy along the reach of the Carp River in the Kanata West development area."

At the time the TPR was completed the reach of the Carp River floodplain from Hazeldean Road to Richardson Sideroad was subject to One Zone Policy with the exception of Two Zone floodplain policy that had been approved at 20 Frank Nighbor and 613 Hazeldean Road.

At page 123 of the TPR, the following points concerning floodplain policy are made:

- The City of Ottawa's intended two-zone flood plain policy is only to be applied in specific areas with existing development with particular emphasis not to create additional building lots.
- The MVC has proposed a modified one-zone policy to be applied to the Carp River corridor forming the Restoration Plan. Correspondence from MNR has referred to the Carp River proposal as a modified one-zone application. Once the Restoration Plan is completed and new flood plain mapping incorporated, MVC intends to reinstate a one-zone policy for this area.

While the TPR has indicated that Modified One Zone Policy is to be used, the TPR did not address how the existing Two Zone floodplain policy inconsistencies are to be addressed.

ii) Two Zone floodplain policy vs. Modified One Zone policy

As noted in the excerpt from page 123 of the TPR (above), "Modified One Zone Policy" appears to be the policy under which development of the existing One Zone floodplain is to proceed. It was my understanding from Mr. Perks' comments about the Terms of Reference that Two Zone floodplain policy was "underlining the whole project".

In the second bullet above, it appears the TPR consultant did not undertake any investigation of floodplain policy of his own. Instead, the TPR consultant deferred to correspondence that was received from MNR long before the June 24th meeting in which Mr. Perks made his comment about Two Zone Policy. An explanation is required concerning the change from Two Zone Policy that was reported to be underlining the

TPR. With the change to “Modified One Zone” policy, the TPR should provide additional discussion about floodplain policy particularly given that the recommended policy does not exist in the PPS. Furthermore, given that MMAH and not MNR, is the lead agency concerning Natural Hazards of the PPS, the TPR should provide additional justification for application of floodplain beyond the support of a Ministry that has no authority over Section 3 of the *Planning Act.*

iii) Locating Stormwater Facilities in the Floodplain

In Section 3.1 of the TPR, the following statement is made about planning to locate SWM facilities in the floodplain:

> There will be SWM facilities located within this flood line that will qualify as acceptable features that can exist in a flood plain under the City’s Official Plan and provincial criteria.

According to Section 3.1.2 of the PPS:

> Development and site alteration shall not be permitted within:
>
> d) a floodway regardless of whether the area of inundation contains high points of land not subject to flooding.

The City of Ottawa is proposing a change to Section 3.1 of the Official Plan in its 2009 update that states:

> "Public utility facilities, Ontario Power Generation Inc. facilities and Hydro One Networks Inc. facilities and **public infrastructure** that are authorized under the requirements of the Environmental Assessment Act, may be permitted in all land-use designations of this Plan." [emphasize added].

Public infrastructure has been emphasized because it has been added to this section of the OP policy.

Referring back to Section 3.1.2 of the PPS, if development (including infrastructure approved under an EA/Class EA) is allowed in One Zone policy areas (the entire floodplain is the floodway), I would presume the nature of the infrastructure would not be permitted to result in site alteration. Site alteration is defined in the PPS as:

> Site alteration: means activities, such as grading, excavation and the placement of fill that would change the landform and natural vegetative characteristics of a site.

Stormwater management facilities are engineered works that change the landform and natural vegetative characteristics of sites. All site alteration in the floodway is not precluded by the PPS. Trenches that need to be excavated for the construction of buried services are permitted, as an example. Section 4.8.1.5 of the OP also limits site alteration to “facilities which by their nature must locate in the flood plain, such as bridges, flood

and/or erosion control structures". Clearly, the stormwater management facilities in Kanata West do not fall within the category of infrastructure that by its nature must locate in the floodplain.

I have submitted comments on the proposed addition of public infrastructure to Section 3.1 of the OP, and will Appeal the matter to the OMB, if necessary.

iv) MNR Technical Guidelines and LRIA Criteria

I was surprised that an independent Third Party Review would not present all of the relevant policy and technical considerations while undertaking the review.

The preface of the Technical Guidelines states

> The management of flood susceptible lands involves a combination of three main program components:
>
> i) Prevention, by land use planning and regulation of development;
> ii) Protection, by applying structural and non-structural measures and acquisition; and
> iii) Emergency response, by flood forecasting/warning and flood/erosion disaster relief.
>
> Over the long-term prevention is the preferred method for the management of flood plain lands. [emphasis added].

The TPR included several excerpts from the Technical Guidelines. However, the excerpts that were presented, and the related discussion of the Technical Guideline in the TPR did not leave any impression that prevention is the preferred method for management of flood plain lands. Instead, the TPR focused more on the "flexibility" of the Technical Guidelines that would leave an uninformed reader with the impression that the Technical Guidelines encouraged the use of structural measures as a floodplain management alternative to preventative measures.

Part 4 – Legal Review

This portion of the review contrasts statements / findings of the TPR with Decisions of the Mining and Lands Commissioner, who hears Appeals under the *Conservation Authorities Act* and *Lakes and Rivers Improvement Act.*

i) MVC's *de minimis* approach to floodplain development approvals

The MVC has been approving filling and development of floodplain along the Carp River for years. Most of their approvals have largely involved fill with little or no compensating cut. A list of sites below are known areas where floodplain has been filled:

1) Castle Glen Subdivision
2) West Creek Meadows
3) Hazeldean Housing Coop
4) Sensplex
5) SMART Technologies
6) Vorlex
7) Corel Center parking lot
8) Terry Fox Drive (First phase)

In addition to the above development sites, more filling and development of floodplain is proposed including 613 Hazeldean Road, 20 Frank Nighbor and the Terry Fox Drive extension – a project that alone proposes a loss of 45,000 m^3 of floodplain storage.

For those sites/projects listed above where Committee reports are available, most provide as justification MVC's support that rarely gets into more detail than that the Carp River floodplain is wide and shallow, or that the impact of the filling of the site specific application is less than 10 cm "which is less than the accuracy of the computer model". Not surprisingly, the 10 cm rule is also cited in the TPR (page 80-81).

> 14. A comparison of flood water levels between existing conditions and future conditions with the development of the Restoration Plan. A 10 cm range of flow level change should be acceptable for comparison purposes. This is valid only if there is no existing flood risk previously identified at the particular location. Water level changes greater than 10 cm could be supported with field data to indicate there is no flood risk. MVC will require field confirmation for any changes in water level to support the change.

A 1988 Mining and Lands Commissioner Decision concerning an appeal by Charles Churchill of the Halton Region Conservation Authority's refusal to issue a Fill Permit discusses the issue of accuracy and *de minimis* principle:

> the witness on examination by the Bench acknowledged that none of the textbooks or the literature adopt a *de minimis* principle of flood plain management and in dealing with this matter the tribunal has never adopted.

> such a principle. The prime reason of the tribunal is that in fairness to all landowners the controls of the *Conservation Authorities Act* and the regulations should be applied to all lands in the floodplain. It would be most unfair if a number of landowners were granted permission and ultimately a firm line would have to be drawn. There is no element of a safety factor in the establishment of a regional storm and in fairness to all landowners, the position adopted by this tribunal has been that no exception should be created on the *de minimis* theory and that all properties should be treated equally. The purpose of the *Conservation Authorities Act* is to prevent the construction of buildings and the placement of fill in flood plains and areas related thereto and in its practice this tribunal has not attempted to create exceptions on the *de minimis* theory particularly as it has noted in the cases that have been placed before it significant changes in the elevation of the regional flood as a result of development in the flood plains.

It is interesting to note in the same Decision, reference to a senior member of the Consulting team undertaking the Carp River Restoration Plan, who was employed by, and testified on behalf of, the Halton Region Conservation Authority – who rejected the fill permit on the basis of the *de minimis* principle. Yet in the Carp River, just downstream from the Glen Cairn Community that flooded twice in recent years, the consultant is advocating the Carp River Restoration Plan proceed on the basis of the *de minimis* principle.

There are many other Decisions of the Mining and Lands Commissioner that can be cited to contrast against the approach to floodplain management taken by the MVC, but in the interest of time I will add only the 1997 Decision involving the Grand River Conservation Authority's refusal to issue a Fill Permit to a Mr. Chalmers.

The Appeal involved the GRCA's refusal to approve the creation of two new lots involving a volume of fill estimated at between **1800 and 2400 cubic metres**. The Appellant's consultants (TSH) tried to argue that the amount of fill was reasonable based on calculated flood level increases of **1.9 inches** which they thought was "minimal".

The Mining and Lands Commissioner denied the Appeal stating:

> "The tribunal finds that granting permission in this case would constitute a precedent for new residential development of other portions of the flood plain in one zone concept areas, involving considerable placing of fill which has measured impacts upstream."
>
> "The tribunal finds that it will adopt the words of Mr. Lorant, whose expert evidence matters of watershed management bears considerable weight, in finding that the proposed filling and construction poses a dangerous precedent, both in terms of the Chalmers land itself and on the ability of this and other conservation authorities to manage watersheds within their jurisdictions."

Contrast the Chalmers versus GRCA Decision with the willingness of the MVC to approve the Terry Fox Drive extension into the Carp River floodplain in the July 28, 2004 Committee Report:

> "An estimated **45,000** cubic metres of floodplain storage area will be lost due to the proposed EA Addendum alignment. The proposed EA Addendum alignment is approximately 18,000 cubic metres more than the 2000 ESR alignment that had a total impacted of about 27,000 cubic metres. The MVCA is aware of this additional floodplain impact, and have agreed that **the loss of floodplain storage will have a negligible effect on the Carp River's flood regime since the Carp River is wide and shallow** in the vicinity of the proposed Terry Fox Drive alignment."

The discovery that flood level increases of 0.18-0.28m in the Sensplex and SMART Technologies development area is symptomatic of the problems associated with MVC's approach to floodplain management along the Carp River that has been based on the*de minimis* principle that is not supported by the Mining and Lands Commissioner and other CAs in the Province.

The MVC should be requested to justify their approach to floodplain management adopting the *de minimis* principle that is not supported by the Mining and Lands Commissioner. Furthermore, the senior member of the Consultant team for the Carp River Restoration Plan should be asked to justify why the Carp River Restoration Plan should be allowed to proceed on the basis of the minimizing the aggravation of flood levels using the*de minimis* principle, when he was an employee of the HRCA that rejected the use of the principle.

The TPR should comment on whether the *de minimis* approach to impact assessment is an appropriate approach when justifying the impact of floodplain development on flood levels.

ii) Flood level increases at Sensplex and SMART Technologies

I sent the following query to MVC after I discovered the increase in flood levels at the Sensplex and SMART Technologies development sites:

> I have noticed that the findings of the TPR documented in Table 3-6 on page 41 include flood level increases of 0.18-0.28m in the river reach from Hazeldean Road to Palladium Drive. The flood level from the 1983 floodplain mapping study is 94.4m at Maple Grove Road and 94.3m at Palladium Drive (which means the flood level increases are even greater when compared against the Regulatory Floodplain Mapping). These flood level increases will cause flooding of private property at the Sensplex and SMART Technologies development sites.

I noticed in the attached letter that the MVC supports the conclusions and recommendations of the TPR.

There are dozens of Decisions of the Mining and Lands Commissioner under the Conservation Authorities Act and under the Lakes and Rivers Improvement Act that state that before private property can be flooded, that written authorization from the impacted property owners is required. Can you please advise that the MVC verified that such authorization has been secured from these impacted property owners prior to MVC's issuance of its support for the Third Party Review?

Part 5) Conclusions / Recommendations

In my Professional Opinion the recommendations of the TPR should be rejected, and the Carp River Restoration Plan and Stormwater Management Plans for Kanata West should be rethought.

These projects lack sufficient technical evidence that they can function as intended; they are contrary to Provincial Policy; and they will result in additional liability for the City.

There is no justifiable need to direct development into flood vulnerable areas while the rest of the world is retreating from such areas out of concerns about climate change. Furthermore, the City is not running out of developable land, given that the City is adding 850 ha to its urban boundary in the Official Plan update underway. There is no policy basis on which a river restoration plan that includes 28 ha of floodplain development can be argued is necessary, or is in the public's interest.

I have many other issues / concerns with the TPR in general, and the Carp River Restoration Plan in specific, but I simply have run out of time to submit my comments within the City's tight timeline.

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