

**Cooksville Creek  
Special Policy Area Study  
Technical Findings**

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**Prepared by the  
Planning and Building Department**

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# **Cooksville Creek Special Policy Area Study**

## **Technical Findings**

### **1.0 INTRODUCTION**

On November 18, 1999, the Council of the Regional Municipality of Peel approved the following recommendation:

**RECOMMENDATION GC-311-1999**

That the Region of Peel request the Credit Valley Conservation (CVC) to undertake a special policy area study of the Cooksville Creek, and assist the CVC and the City of Mississauga in this regard.

This recommendation was approved in conjunction with the approval of Official Plan Amendment 69 which designated the lands on the west side of Camilla Road and north of the North Service Road as "Residential High Density II". OPA 69 has been appealed by the CVC and the Ministry of Municipal Affairs and Housing (MMAH).

A meeting was subsequently held with representatives from the City, CVC, Ministry of Natural Resources (MNR), MMAH and the Region of Peel wherein it was determined that the City should take the lead for the study and the other agencies to provide technical support. A steering committee was formed with representatives from all City departments, CVC, the Province and the Region of Peel. This steering committee approved the Terms of Reference for the study and have been providing input throughout the study.

On October 10, 2001, City Council approved the following recommendation:

**RECOMMENDATION PDC-0130-2001**

1. That City Council authorize the commissioning of the Cooksville Creek - Special Policy Area Study to be undertaken by consultants for a cost of not to exceed \$100,000.00 with funding from the Corporate Contingency Account as set out in

the report titled "Cooksville Creek - Special Policy Area Study" dated September 11, 2001 from the Commissioner of Planning and Building.

2. That the amount of \$100,000.00 be transferred from the Corporate Contingency Account to the Planning and Building Department current budget, account 1-715602-26741, to fund the Cooksville Creek - Special Policy Area Study for the year 2001.

3. That a copy of this report titled "Cooksville Creek - Special Policy Area Study" dated September 11, 2001 from the Commissioner of Planning and Building be forwarded by the City Clerk to the Credit Valley Conservation, the Region of Peel, Ministry of Natural Resources and the Ministry of Municipal Affairs and Housing.

As per the direction from the City Council on October 10, 2001, the City retained Philips Engineering Ltd. in conjunction with B.G.D. Consulting Inc., Parish Geomorphic and Davis & Co. to fulfill the requirements of the SPA study. There have been many studies completed over the years for the Cooksville Creek including the most recent titled *The Cooksville Flood Remediation Plan - Final Report* completed in May 2002 by Environmental Water Resources Group (EWRG). The consulting team have compiled the information from the previous studies, verified the findings, undertaken additional work and have provided a number of recommendations. This report highlights the work of the consulting team to date and based on their findings makes recommendations with respect to resolving outstanding planning issues on specific development sites.

## **2.0 ISSUE STATEMENT**

The Cooksville Creek Watershed, shown in Appendix A , passes through nine planning districts, draining 3,300 ha (8,154 ac.) of land and outlets into Lake Ontario. There are approximately 309 homes and other buildings in the floodplain, most of which were built prior to the limits of the

floodplain being mapped. It is a highly urbanized watershed, with a flat, ill-defined floodplain valley. The watercourse flows over highly erodible shale which complicates the stream dynamics and causes bed and bank instability. The hazards associated with the Cooksville Creek are twofold: flooding and bank erosion.

The Provincial Floodplain Management Policy for the Cooksville Creek is premised on the one-zone concept, whereby, the Regulatory Floodplain is defined by the greater of either the flood produced by the Regional Storm (Hurricane Hazel) or the 100-year storm. In most parts of the watercourse, the streamflows produced by the Regional Storm are greater than those produced for the 100-year storm. The CVC polices, which have been incorporated into the *Region of Peel Official Plan, City Plan* and the City Council - adopted *Mississauga Plan* prohibit development or intensification within the Regulatory Floodplain. Yet, there are a number of sites that would be desirable for development if it were not for the flooding issue. The OPA 69 lands are an example of this situation.

The Cooksville Creek *Flood Remediation Plan - Final Report*, May 2002 investigated hydraulic conditions causing flooding along Cooksville Creek and developed economic assessments of flood damages for the 2 through 100-year and Regional Storms. It also investigated the cost of complete removal of all at-risk properties from the Cooksville Creek floodplain and concluded the cost would outweigh benefits for such a program. The study, however, proposed a program of channel and culvert improvements to mitigate existing flood damages which have been recommended to be incorporated in the Capital Works Budget. Therefore, the *Cooksville Creek SPA Study* has worked with this premise and further investigated which supplemental structural improvements would be feasible to make land available for development and if that option was not available, where a relaxation of the policies would provide assistance.

### **3.0 POLICY APPROACHES TO FLOODPLAIN PLANNING**

The Provincial Policy Statement outlines three approaches to floodplain planning.



### 3.1 One-Zone Areas

This approach places the entire Regulatory Floodplain in a single (one-zone) category. In the one-zone policy area, no new development is permitted within the floodplain; however, it is recognized that certain buildings and structures must be located in the floodplain due to the nature of their use, such as public works. The CVC has detailed policies in its *Watercourse and Valleyland Protection Policies* which, among other things, allow for minor additions to existing buildings and limited development subject to specific criteria. They do not, however, allow for rezonings and land severances which would intensify development within the floodplain. The one-zone approach is used in most areas of the City.

### 3.2 Two-Zone Areas

In designated two-zone areas, the floodplain is divided into two distinct sections, the floodway and the flood fringe. The floodway is typically the area that has the greatest depth and velocity. The flood fringe is the area between the floodway and the edge of the floodplain where the depths and velocities are typically much less than in the floodways. If an area is designated as a two-zone policy area, new development can occur in the flood fringe provided that the development meets certain floodproofing criteria. All buildings must be flood proofed to the Regulatory Flood level and all habitable floor space must be above the elevation of the Regulatory Flood level. A two-zone policy area prohibits all development, including additions, within the floodway. There is a two-zone area in Malton along the west branch of the Mimico Creek.

### 3.3 Special Policy Areas (SPA)

An SPA may be established in areas historically settled within the floodplain where: 1) the application of one-zone and two-zone policies is not feasible, 2) a prohibition of development or redevelopment causes social and economic hardship for the community and 3) all other requirements for an SPA can be met. The Ministry of Natural Resources states in its

Implementation Guidelines, October, 1988 "Municipalities should note that by permitting development in the floodway or where protection is not provided to the level of the regulatory flood, the special policy area concept places a greater level of risk upon landowners and increases the potential for loss of life and property damage". An Official Plan amendment would be required to include policies that address the reduced level of flood protection for new development, as well as any other site specific issues. There are two SPAs, within the City: at Dixie Road and Dundas Street East; and, along Dundas Street East at the Etobicoke Creek. These were put in place at the time the Provincial Flood Plain Policy statement came into effect and did not go through the study that is now required for an SPA.

**3.4 Flood Proofing**

Any new development which is permitted in the floodplain must be flood proofed and have flood free ingress/egress during times of flooding. These standards are based on the depth of the water and the speed of the moving waters. At some point, if the water is too deep or moving too fast, structures will not withstand the pressure from the water nor would people be able to walk through the moving water to reach safety. Also, if the water is too deep, it may be impossible for vehicles to enter or exit a site. The following Provincial standards provide guidance:

<b>Condition</b>	<b>Maximum Depth</b>	<b>Maximum Velocity</b>
Stagnant Water	1.4 m (4.6 ft.)	0.0 m/s (0.0 ft./s)
Shallow Water/High Velocity	0.5m or less(1.6 ft.)	1.8 m/s (6 ft./s)
Combination (0.4m <sup>2</sup> /s or 4ft <sup>2</sup> /s)	0.8 m (2.6 ft.)	1.7 m/s (5.5 ft./s)

<b>Vehicle Type</b>	<b>Maximum Depth</b>	<b>Maximum Velocity</b>
Typical	0.3 -0.5 m (1-1.5 ft.)	3m/s (10 ft./s)
Emergency	0.9 - 1.2 m (3 - 4 ft.)	N/A



### **3.5 Erosion Hazards**

The above options do not address the erosion hazards associated with watercourse corridors. The CVC also has erosion setback standards which prohibit buildings from being located too close to the top of a stream bank and risk bank failure. The policies are incorporated in the *Region of Peel Official Plan* which directs municipalities to generally prohibit development and site alterations within the one-hundred year erosion limit. The policies are also contained within *City Plan* and the City Council - adopted *Mississauga Plan*. The policies restrict development within identified hazard areas which is to be determined on a site by site basis through the greater of the "Top of Bank" and/or combined influence of the stable slope/stable slope allowance, erosion allowance and the average annual recession rate. The erosion hazard must be addressed for any site being considered for development, irrespective of the applicable floodplain policy approach.

## **4.0 OVERVIEW OF TECHNICAL FINDINGS**

One requirement of an SPA study is to ensure that there has been a comprehensive review of all the relevant information as it pertains to the floodplain. Although only certain sites are under consideration for policy variation, the entire watershed was examined. The following were undertaken as part of this review.

### **4.1 Literature review**

As part of the background work, the consulting team reviewed the following materials: previous studies undertaken for the Cooksville Creek watershed (11 in total), Provincial, Regional, CVC and City policy documents regulating development within hazard lands, and hydrologic flows and hydraulic water levels and velocities that are used within the Cooksville Creek watershed.

## 4.2 Hydrologic Check

The hydrologic modelling for the Cooksville Creek has never been verified against the actual stream flow and rainfall data. A stream flow gauging system was put in place from May 2002 to the end of November 2002 and measurements were taken that can be used to test the models being used in the future.

Further work was also undertaken to examine flood storage options to reduce flows. Floodplain modelling assumes that man-made structures such as railway and highway embankments cannot be used to hold back flood water flow as they may fail in the event of a large storm event. This study looked at the feasibility of using these structures to hold back floodwaters and ranked them according to their effectiveness. The difficulty with two of the four sites identified is that they cause flooding of potential development sites and are beyond the critical area where flood storage is needed. The other sites were discounted based on their unsuitability and ineffectiveness for flood storage. Therefore, the study is not recommending that any of the existing man-made structures be used for flood storage.

## 4.3 Topographic mapping check

There was some uncertainty with respect to the accuracy of the City's topographic mapping. Floodline mapping is based on the contour elevations from the topographic mapping. The consultants were asked to ensure that the mapping meets the Provincial standards with respect to accuracy. While the allowable margin of error is exceeded in a few spots, the City's mapping is considered acceptable for this study.

## 4.4 Stream Morphology Assessment

Notwithstanding any proposed changes to the floodplain policies, the City must acknowledge, the creek channel is subject to erosion and is moving, a natural phenomenon which is exasperated by land use change. The *Cooksville Creek Rehabilitation Study*, completed in 1997, noted that the stream bed is easily eroded through several processes including chemical, physical, freeze-thaw

and wetting-drying weathering. The gradual urbanization and changes in watershed hydrology have likely accelerated the rate of channel erosion due to increased volume, duration and peak levels of frequent active channel flow. The erosion rate of the creek channel is dependant on the smaller, more frequent rainstorms that the City experiences every year, not just the big storm events. Also, the channel is not in its natural form, as much of it has been altered through fixed bends, gabion baskets, armour stone, concrete lining, bridges, culverts and other engineering works. To better understand the movements of the river, the consultants reviewed air photos dating back to the 1950's and documented the changes. The consultants attempted to project the long term erosion that will occur in the future but, due to the channelization that has occurred and the relatively short time period of historical data, the findings were not conclusive.

The consultants did a comparison of a technical corridor (allowing natural erosion to occur) based on a theoretical channel evolution model which was compared with a maintenance and policy corridor approach, which is based on CVC policy, future construction, maintenance, and easement requirements. This process was applied to each reach of the creek to reflect the differences as one moves along the watercourse corridor. The result was a set of corridor limits to ensure no buildings are impacted through erosion. The corridor limits, roughly centred on the existing creek, are the widest at Lake Ontario (85.9 m or 282 ft.) and narrow as one moves northward up the creek system, (57.4 m or 188 ft. at Matheson Blvd.).

#### **4.5 Hydraulic Modelling**

The SPA study relied on existing modelling from previous studies. However, the model was updated to reflect the current mapping base and as a result, there are some differences around the computed flood elevations which may require an update to the 1996 floodline mapping. This model allowed the consultants to evaluate the changes in depth and velocity of the water based on the various structural and development scenarios and, thereby, undertake risk and feasibility analysis of the various options.

#### **4.6 Feasibility of Structural Improvements to Relieve Flooding**

Over the years, it has been suggested that there are things that could be done to reduce the flooding and erosion on potential development sites. This study reviewed previous flood control/management works which have been undertaken in the Cooksville Creek. It also reviewed the recommendations of the *Cooksville Creek Flood Remediation Plan - Final Report* including crossing upgrades at Kirwin Avenue, CP Rail, CN Rail, the QEW and the Queensway. All but Kirwin Avenue are under control of other agencies. Also, it examined the feasibility of watercourse capacity enlargements, a system of dykes and berms and finally, supplemental storage in the form of stormwater ponds. As it was determined to be of marginal benefit to build an on-line pond along the watercourse south of Mississauga Valley Boulevard, the focus was north of Mississauga Valley Boulevard. Large, open tracts of land are scarce in the watershed. However, two sites were identified for stormwater management ponds: one north of Eglinton Avenue West and west of Hurontario Street; and, the other on the Peel Board of Education lands north of Bristol Road. It was noted that there would be no reduction in flooding levels from such a pond and it would help reduce erosion only immediately downstream from such a facility in that portion of the creek which is already channelized. Therefore, a new, large stormwater management pond to alleviate flooding has been discounted.

#### **4.7 Floodplain and Erosion Management Alternatives Assessment**

The Provincial requirements for SPA studies require that all structural alternatives be discounted prior to considering alternative policies for floodplain management, then the feasibility of a two-zone approach must be investigated prior to considering an SPA. For each of the development sites shown in Appendix B, the study makes the following recommendations:

##### **4.7.1 Former Inglis Property - Lakeshore Road East**

This site is located north of Lakeshore Road East, south of the Canadian National Railway and includes the vacant former Inglis site on the east side of the Cooksville Creek and the industrial

lands on the west side of the creek. The lands are designated “Business Employment” in both *City Plan* and the City Council - adopted *Mississauga Plan*. The lands are zoned “M1-Industrial”. The east parcel is 5.3 ha (13 ac) in size and the west parcel is 5.5 ha (14ac.) in size.

This site has tableland on both the west and east side of Cooksville Creek but it does not have flood free access. The SPA study has suggested two possible options: either enlarging the culvert under Lakeshore Road East; or raising the road profile of Lakeshore Road East at either end of the site with a compensating lowering within the centre zone, between the two parcels of land. If these options are pursued, it is possible to have approximately 4.4 ha (10.8 ac.) of developable land west of the Cooksville Creek and 3.6 ha (8.8 ac.) on the east side based on maintaining the one-zone policy standard, an 85.9 m (281 ft.) erosion standard and a 30 m (98 ft.) setback from the rail lands. Therefore, neither a two - zone nor an SPA policy area was recommended for this site.

#### **4.7.2 Consulate Property Camilla Road - North of the QEW**

This 1.3 ha (3.2 ac.) vacant site is located north of the North Service Road, west of Camilla Road. The lands are designated "Other Commercial" by the *Cooksville District Plan - Munden - Park Area* due to the fact that OPA 69 to *City Plan*, which proposed designating the lands as “High Density II”, was appealed by the CVC and MMAH. The City Council - adopted *Mississauga Plan* recognizes the appeal of OPA 69. The lands are zoned “R3”.

Although it was OPA 69 which triggered the SPA study, surrounding lands were also examined. There is a large area between the 100-year floodline and the Regional Floodline that would be subject to shallow flooding (< 0.6 m or 24 in.). If the culvert under the QEW was upgraded, it would remove the floodplain designation for most of the lands. The culvert upgrade will be costly, likely in excess of \$4.5 million but could be financed through an agreement among the City, the Provincial Ministry of Transportation (MTO) and benefiting landowners to share the cost of construction. As an interim solution, however, a two-zone policy area could be put in place for the lands between the 100-year and the Regional Floodlines. (This includes the Consulate site as

well as surrounding lands.)

A two-zone policy area approach would require, as a condition of development, the provision of flood free access roadways (ie. North Service Road) as well as the elevation of the development site above what would 'normally' be done to raise buildings and the lowest openings would have to be above the current Regional flood elevation. The properties that would remain in the floodway would have a very restrictive framework applied to them with respect to additions or new structures. An Official Plan amendment and Zoning By-law amendment would be required to designate the site and others for an interim two-zone floodplain management area.

The lands are also subject to a shallow spill potential from Cooksville Creek upstream of Camilla Road. As part of any development approval, the land owner will have to accurately establish spill flow mechanics both across the site and back to the creek and address this issue prior to proceeding.

#### **4.7.3 F & F Construction - Camilla Road**

This 2.6 ha (6.4 ac.) vacant site is located on the west side of Camilla Road, south of the Queensway. The land use designations were deferred in *City Plan* and proposed to be "Greenbelt" and "Residential Low Density I" in the City Council - adopted *Mississauga Plan*. The land use designations in the *Cooksville District Plan - Munden- Park Area* designate the lands "Greenbelt" and "Residential Low Density I". The lands are zoned "R3".

There are no structural options available to relieve the flooding on site. There is virtually no difference between the 100-year and Regional Storm Floodlines. Therefore, a two-zone approach would be of little benefit. The site currently has flood free access to Camilla Road and tableland outside the floodplain. It is recommended that a SPA not be pursued for this site and, further that the one-zone policy in the official plan continue to be in effect.

#### 4.7.4 Humenik Lands - Shepard Avenue

These lands are located on both sides of Shepard Avenue and are occupied by residential detached dwellings. The total land holdings including Shepard Avenue are approximately 8.8 ha (22ac) in size. The land use designation was deferred in *City Plan*. The City Council - adopted *Mississauga Plan* designates the lands as "Residential - Medium Density I" and "Residential Low Density I". The Official Plan policies that apply are contained in OPA 151 to the *Township of Toronto Planning Area now Official Plan of the City of Mississauga*, dated 1963. The land use is "Residential Multiple Family" which is undefined in the plan but would permit a range of housing types. The lands are zoned "R1". Although the landowner has expressed a desire to redevelop the lands for high density, no application has been filed.

The location of the 100-year and the Regional Storm Floodlines are very close. Although virtually all the lands are within the floodplain, most would be subject to shallow flooding. These lands have been approved for channelization by the CVC in 1997; but the landowner has not fulfilled the requirements imposed by the CVC decision to undertake the works. The study has provided options for the landowner to pursue all of which have costs and benefits.

It is possible to undertake cut and fill and channelization works in order to facilitate development. However, the works would need to incorporate the stable creek characteristics, (the ability for the channel to meander as opposed to a straight channel) and incorporate balancing flood storage. To achieve these conditions, a 72 m (236 ft.) meandering wide parcel centred on the existing creek alignment is required through the property. This would leave approximately 8.6 ha (21.2 ac.) for development. The straight line corridor option would be much wider 95 m (311 ft.). With either option, the land outside the channel would require filling to raise them to the Regulatory food level.

Although the City and the CVC do not support channelization and cut and fill in order to facilitate development, this circumstance is unique. The area is developed, with 30 homes within the floodplain and the channelization works would remove these homes from the floodplain and the associated risk. Therefore, consideration has been given to this option. From a hazard perspective, it is preferable to resolve the flooding hazard rather than considering relaxing the policy through a SPA.

The study also identifies the possibility of implementing a two-zone policy area due to the fact that the lands are subject to widespread shallow flooding which would be considered the flood fringe. Under this scenario, flood free access would still need to be addressed.

At this point which option will be pursued will depend on the development scenario put forward by the landowner and the detailed studies accompanying the application. Depending on the details associated with future development plans for the area it may also be possible to do a hybrid of channelization and two-zone management.

#### **4.7.5 Little John Lane**

This 0.4 ha (1 ac) vacant site is located north of Dundas Street East, between Little John Lane and Kirwin Avenue. The site is designated "Retail Service Commercial" and "Greenbelt" in *City Plan* and zoned "C1" and "R3". The proposed revised commercial polices of the City Council-adopted *Mississauga Plan* designated the site "Greenbelt" and "Mainstreet Commercial". The work undertaken indicates that the potential exists that the area within the Region floodline may be a significantly different that shown on the 1996 Regulatory Floodline Mapping. As part of a development application the landowner would need to confirm this with the CVC. There is no need to pursue a revised policy for this site.