KSGS Engineering Corp.

2019 DEVELOPMENT CHARGES BACKGROUND STUDY: STORMWATER DRAINAGE COMPONENT

CITY OF MISSISSAUGA

Submitted by: **KSGS Engineering Corp.**
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May 2019

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Attachments

EXECUTIVE SUMMARY

KSGS Engineering Corp. was retained by the City of Mississauga to carry out this 2019 Storm Drainage Development Charge Background Study.

At the outset of the project, a detailed review of the stormwater development charge components was undertaken. The review was done in the context of accepted methodologies used in previous stormwater development charge study updates and municipal precedent. The review also took into consideration the City's Stormwater Charge along with changes to City and Provincial requirements.

At the conclusion of the review, a number of components were refined for the current study update. Accordingly, the following stormwater development charge components are deemed to be growth related, in part or in whole:

1) Stormwater drainage related background studies and monitoring;
2) Storm sewer oversizing;
3) Stormwater management which includes stormwater management facility retrofits, flood relief and new stormwater management facilities;
4) Stormwater conveyance; and,
5) Creek erosion works, which include identified works and future works.

Hemson Consulting completed a vacant land supply analysis for the City. For the purposes of the development charge calculation it was found that the available development lands, that are vacant and lands with redevelopment potential, is 1,567 hectares. This represents 5.4% of the total area of the City.

The total cost of growth-related works calculated in this study is $75,611,567. In netting out the reserves, the resulting total stormwater management capital cost to be recovered through development charges is $23,062,552. Based on the available development lands noted above, the storm drainage component of the development charge is $14,718 per hectare.

1. DEVELOPMENT CHARGE UPDATE -STORMWATER DRAINAGE

1.1 Introduction

KSGS Engineering Corp. was retained by the City of Mississauga to carry out this 2019 Storm Drainage Development Charge Background Study ("Storm DC"). The Development Charges Act (DCA) requires the preparation of a background study to support proposed Development Charge rates. The City has updated its Storm DC every five years since 1999, as mandated by the DCA. The content of this report is typically appended to the overall City-wide Development Charge Background Study which looks at a broader range of services (e.g. Fire, Library, Parks, etc.) as this study focuses solely on the stormwater program. The City-Wide Development Charge Study has been undertaken by Hemson Consulting and supported by KSGS Engineering Corp, while the Storm DC has been led by KSGS Engineering Corp. and supported by Hemson Consulting.

A long-term planning horizon from 2019 to 2041 has been used for the purposes of the Storm DC calculation. Consistent with the City's historical practice, the Storm DC calculation is calculated as a cost per net hectare, which in part recognizes that storm drainage is a function of the impervious area within a development parcel.

The Storm DC considered a list of growth-related capital projects between the years 2019 and 2041. Each project included the following information:

- Project name
- Work category
- Anticipated year of work
- Type of work (i.e. study, EA, design, land acquisition, construction etc.), and
- Estimated cost

1.2 Approach to Study Update

The past approach to this study has assumed that development charges are collected to carry out the following categories of work:

- Watercourse Erosion Control (identified and future)
- Conveyance (including channelization and culvert upgrades)
- Stormwater Management Facilities (new and retrofits)
- Storm Sewer Oversizing
- Studies

As part of this 2019 Storm DC, a review was undertaken with the City of the historical approach, which was developed well over twenty years ago at a time when greenfield development was prevalent, to determine its relevance in today's development climate. The City has since progressed from greenfield development to intensification and

redevelopment, and has also introduced the Stormwater Charge ("SW Charge"), as a move away from funding the stormwater management program from the property tax base. The SW Charge is a fair and equitable dedicated source of funding for stormwater projects based on impervious area of the largest stormwater contributors, and is coupled with a credit program that rewards the implementation of on-site measures that benefit the stormwater program. The SW Charge is distinctly different from the Storm DC in that the Storm DC is specifically for growth-related projects.

In reviewing the City's approach to completing past Storm Drainage Development Charge Background Studies, the key finding notes that; as the City is significantly built-out, the retrofitting of existing stormwater management facilities (SWMF) and storm outlets is assessed with a greater benefit to existing development (non-growth) than previous studies.

1.3 Analysis for Available Development Lands

The storm water management development charge is calculated as a uniform charge per net hectare of chargeable vacant land. To determine the amount of chargeable vacant land, Hemson Consulting, in collaboration with the City's Environmental Services Section and Open Data sources, prepared an inventory of all the vacant residential, non-residential, mixed use lands and lands available for redevelopment that are eligible to be recovered through development charges. In order to determine the redevelopment potential of sites, an assumption of 2.5 per cent has been applied to the occupied lands throughout the identified watersheds. Although the redevelopment potential of individual sites vary, the 2.5 per cent assumption is intended to represent a City-wide average. The resulting total future net developable area is 1,567 hectares after adjusting for the redevelopment potential of occupied lands. This land will be subject to the storm water management development charge and represents 5.4% of the total area of the City, as noted in **Table 3.1**.

1.4 LID Resolution

"Low Impact Development" measures, or "LID," is a suite of stormwater management practices typically implemented close to the source of stormwater runoff that aids in reducing the impact of runoff volume. The City of Mississauga has been adopting LID across various public realm areas over the last decade through inclusion in capital projects such as parks, fire stations, libraries and road right-of-way's. LID techniques utilized include, for example, bio-retention systems, permeable pavements, green roofs and infiltration systems. Additionally, the City has updated stormwater management requirements within the "Development Standards" to require development applications to include LID. This practice had been occurring voluntarily to a certain degree however a minimum 5mm requirement was formalized in 2016.

On September 13, 2017, City Council resolved that, "LID options be considered and evaluated and, where appropriate, included in the scope of the upcoming Development Charges Background Study-Storm Drainage Component in support of the City's Development Charges Update in 2019." The Council Resolution is included in **Appendix A**.

As part of the review to the overall approach, discussed in the section above, this matter was considered. It was found that the state-of-the-industry at the time of this writing is such that LID is reasonably common. Moreover, DC funding for infrastructure has typically been applied to "trunk" infrastructure (e.g. as with the approach for storm sewers) and as LID is implemented at a local, "at-source" scale, it is found in this instance that DC funding would not apply to the LID measures expected in the City.

2. STORMWATER DRAINAGE

The following stormwater drainage components were re-evaluated to be updated in the current study:

1) Watercourse Erosion Control (identified and future)
2) Conveyance (including channelization and culvert upgrades)
3) Stormwater Management Facilities (new and retrofits)
4) Storm Sewer Oversizing
5) Studies

Each of the above is further discussed in the sections below with respect to growth related works and apportionment of cost. In the calculations, it should be noted that the latest Non-Residential Building Construction Price Index (NRBCPI) data was obtained from Statistics Canada, where applicable, to bring the project cost as close to "Present Value" as possible.

2.1 Erosion Control Works

Identified Works

Creeks and water conveyance channels in the City of Mississauga continue to experience erosion. The City has had to carry out erosion control works based on priorities identified in various background studies and through annual condition assessments.

The priority projects to be implemented in the City's Capital Works Budget/Forecast ("Capital Plan") are shown in **Table 2.1**. If applicable, the supporting study for the erosion control work is noted in the second column of Table 2.1. The development charge portion of each project is calculated based on the percentage of available development lands within the respective watershed where the project is located, as discussed in Section 1.3 above and shown in **Table 3.1**.

Future Works

Future erosion control works are those anticipated in the future but not yet identified in the City's Capital Plan. The total length of future erosion control was established from desktop assessment and field investigation during the 2014 development charges study update.

The method being used to carry out the current 2019 update is consistent with that used in the 2014 study update. The total length has netted out the quantity completed by the City between the year 2014 and 2018. An updated summary of future works estimated based on watershed is shown in **Table 2.2**.

The cost of future erosion works to be allocated to development charges is calculated based on 5.4% of total estimated cost, as this percentage represents an average of available development lands City-wide, as shown in **Table 3.1**.

The estimated unit rate for creek restoration works is based on past projects of a similar nature from various local and regional municipalities as shown in **Table 2.3**. The original data in **Table 2.3** was taken from the 2014 study update. Recent projects completed by the City were added to the list.

Minor Erosion Control Works

Item **C** in **Table 2.1** is related to minor erosion control works, the total cost is based on a fixed annual rate for the next 22 years. The development charges related portion is based on 5.4% as this percentage represents an average of available development lands City-wide, as shown in **Table 3.1**.

2.2 Stormwater Conveyance

The main types of stormwater conveyance related works are; channelization, culvert improvements, and drainage improvements. These projects have primarily been identified in the City's Capital Plan, with some being raised through other background studies.

For example, a project identified outside of the City's Capital Plan is the upgrade of a crossing related to the Ninth Line Lands Study to facilitate development. This particular project was identified in the "Shaping Ninth Line" study that plans for the growth area along the west side of Ninth Line between Eglinton Avenue West and Highway 401. The upgrade of a watercourse crossing on the west side of Highway 407 will assist in unencumbering development lands on the east side of Highway 407 where new development is slated.

The portion of cost for stormwater conveyance allocated to future growth was based on the percentage of available development lands within the watershed where the project is located. **Table 2.4** depicts the list of stormwater conveyance projects identified for the study period.

2.3 Stormwater Management Facilities

Stormwater management end-of-pipe facilities are a key component in the stormwater development charge study. Outlined below are three (3) sub-components identified in past development charge studies that were reviewed in this current update.

1) New SWM Facilities.
2) Stormwater Quality Retrofit.
3) Flood relief.

1) New SWM Facilities

New stormwater management facilities have been identified in the City's Capital Plan. In preparing this study update, all of the costs related to Environmental Assessment (EA), design, construction and land to complete the new facilities were taken directly from the City's Capital Plan.

Since these facilities are required to service future development, one hundred percent of all EA, design, construction and land cost are to be funded by stormwater development charges. For a detailed summary, refer to **Table 2.5.**

The Sheridan Park Corporate Centre stormwater management facility is the only exception, being attributed to available development lands, as this facility will serve municipal lands beyond the proposed future development.

2) Stormwater Quality Retrofits

As stated in Section 1.2; the review of the City's approach on this item found that as the City is significantly built-out, the retrofitting of existing stormwater management facilities (SWMF) and storm outlets provides a benefit to existing development (non-growth). As such, the development charge component for this category is assessed on the available development lands.

Through the Mississauga Stormwater Quality Control Strategy (MSWQCS) study update, the City has identified opportunities to improve water quality by retrofitting existing stormwater management facilities. Stormwater retrofitting typically involves increasing capacity of permanent pool, modifications to the outlet control structure, landscaping and other restoration works.

The apportionment of stormwater quality retrofit cost to stormwater development charges is based on the percentage of available development lands in relation to the total area of the watershed where the project is located. For details, refer to development lands calculations performed by Hemson Consulting in **Table 3.1.**

3) Flood Relief Works

Building upon the report completed in the 2014 study update by Aquafor Beech Limited, Item **C** of **Table 2.5** outlines the flood relief projects identified in the City's Capital Plan for providing flood relief.

The portion of total cost of providing flood relief that is attributable to stormwater development charges is based on the available development lands in the watershed. The available development lands were determined to be 4.7% in the Cooksville Creek watershed.

2.4 Storm Sewer Oversizing

Storm sewer oversizing is a process to improve existing storm sewer systems to accommodate historically induced growth. Based on past history, large sewers generally service drainage areas that are owned by a number of land owners. In the City of Mississauga, trunk sewers are those with a diameter greater than 1500 mm. The cost component of the pipe greater than a 1500 mm pipe is eligible for stormwater development charges.

To determine the location where this situation may occur and when such works may take place is difficult. As such, an estimate has been provided for the 2019 to 2041 time period, which carries forward the assumption of $270,000 per year. **Table 2.6** depicts the yearly cost estimate for storm sewer oversizing. The total amount of storm sewer oversizing is 100% eligible for the stormwater development charges as it is directly related to growth.

2.5 Studies

The full cost of this component is attributable to growth, therefore is eligible to be funded by stormwater management development charge. For studies that have a growth element but also have benefit-to-existing, the apportioning has been allocated based on a City-wide percentage if applicable, or relative to the watershed, if the study is watershed-specific. A summary of studies applicable to stormwater development charges is shown in **Table 2.7**, and the apportioning has been annotated accordingly for clarity.

3. SUMMARY OF 2019 STUDY UPDATE

The purpose of this 2019 Storm Drainage Development Charge Background Study was to undertake a review of the approach to date with consideration to municipal precedent and generally accepted practice; and to complete the calculations in support of the Development Charges By-law.

The following stormwater drainage components are deemed to be growth related and therefore are included in the current study update:

1) Stormwater drainage related background studies and monitoring;
2) Storm sewer oversizing;
3) Stormwater management which includes stormwater facility retrofits, flood relief, new stormwater management facilities;
4) Stormwater conveyance; and,
5) Creek erosion works, which include identified works and future works.

Hemson Consulting completed a vacant land supply analysis for the City. For the purposes of the development charge calculation it was found that the available development lands, that are vacant and lands with redevelopment potential, is 1,567 hectares. This represents 5.4% of the total area of the City.

The total cost of growth-related works calculated in this study is $75,611,567. In netting out the reserves, the resulting total stormwater management capital cost to be recovered through development charges is $23,062,552. Based on the available development lands noted above, the storm drainage component of the development charge is $14,718 per hectare.

A summary of the calculations is depicted in **Table 4.1.**

TABLE 2.1 – SUMMARY OF EROSION CONTROL WORKS

TABLE 2.1:
SUMMARY OF EROSION CONTROL WORKS

A - EROSION CONTROL - IDENTIFIED WORKS

			Budget Timing		Cost Estimates			DC Costs	
Map ID#	Background Study*	Project Name / Location	EA & Design	Construction	EA & Design Cost	Construction Cost	Total Cost	DC Portion	DC Amount
COOK-1100-01	CCRS site #4b	Cooksville Creek Erosion Control - CP Rail to Kirwin Avenue		2019			$720,000	4.7%	$33,840
COOK-0600-01	CCRS site #2e	Cooksville Creek Erosion Control - QEW to Elaine Trail		2019			$2,210,000	4.7%	$103,870
COOK-2300-01	CCRS site #7a	Cooksville Creek - Meadows Blvd. to Rathburn Rd. E.		2019			$3,560,000	4.7%	$167,320
ETOB-2200-01	--	Etobicoke Creek Erosion Control - contributions to TAM for Tomken Rd. Bridge		2019			$80,000	5.7%	$4,560
MIMI-1200-01	--	Mimico Creek Erosion Control - Etude Drive to Derry Road East		2020			$370,000	4.7%	$17,390
COOK-1200-01	--	Cooksville Creek Erosion Control - Mississauga Valley Blvd to CP Rail	2019	2021	$210,000	$1,180,000	$1,390,000	4.7%	$65,330
COOK-1300-02	--	Downstream of Mississauga Valley Boulevard	2019	2021	$60,000	$1,320,000	$1,380,000	4.7%	$64,860
SAWM-0400-01	SCNCDS Reach # 1 & 4	Sawmill Creek Erosion Control - The Folkway to Erin Mills Pkwy	2019	2021	$350,000	$1,670,000	$2,020,000	4.4%	$88,880
MIMI-0600-01	--	Mimico Creek Erosion Control - upstream and downstream of Rena Rd.		2020			$1,200,000	4.7%	$56,400
SHER-0300-01	--	Sheridan Creek Erosion Control - Lushes Ave. to behind Fletcher Valley Cres.		2020			$3,380,000	6.5%	$219,700
CRED-0300/0400-01	--	Credit River Erosion Control - North and South of QEW	2020	2022	$310,000	$1,690,000	$2,000,000	5.7%	$114,000
COOK-0700-01	--	Cooksville Creek Erosion Control - Camilla Road to North Service Road	2020	2022	$100,000	$760,000	$860,000	4.7%	$40,420
ETOB-0900-01	internal (2007 WCE)	Etobicoke Creek Erosion Control - Eglinton Avenue to Hwy. 401	2020	2022	$290,000	$1,690,000	$1,980,000	5.7%	$112,860
CRED-1700-01	CRAMS site #4	Credit River Erosion Control - West of Creditview Rd, behind Kenninghall Blvd	2020	2022	$330,000	$1,900,000	$2,230,000	5.7%	$127,110
COOK-2400-01	--	Cooksville Creek Erosion Control - Behind Tribal Court	2020	2022	$70,000	$300,000	$370,000	4.7%	$17,390
APPL-0300-01	--	Applewood Creek Erosion Control - Lakeview Golf Course		2021			$2,900,000	3.0%	$87,000
LETO-0200-01	--	Little Etobicoke Creek Erosion Control - Dundas Street to Dixie Road		2021			$850,000	4.0%	$34,000
LETO-0100-01	--	Little Etobicoke Creek Erosion Control - Downstream of Dundas St. E.	2021	2023	$100,000	$460,000	$560,000	4.0%	$22,400
COOK-0200-01	CCRS site #1c	Road East	2021	2023	$50,000	$150,000	$200,000	4.7%	$9,400
MULT-0900-01	MCRS site #6b	Mullet Creek Erosion Control - Tannery Street to Thomas Street	2021	2023	$180,000	$1,010,000	$1,190,000	5.3%	$63,070
MULT-0700/0800-01	MCRS site #5a & 5b	Mullet Creek Erosion Control - GO Transit to D/S of Erin Centre Blvd	2021	2023	$120,000	$600,000	$720,000	5.3%	$38,160
WOLF-0200/0300-01		Wolfedale Creek Erosion Control - Central Parkway W to Dundas St.	2022				$150,000	3.3%	$4,950
LETO-1200-01	--	Little Etobicoke Creek Erosion Control - Downstream of Britannia Road East	2022	2024	$140,000	$760,000	$900,000	4.0%	$36,000
MULT-2000-01	--	to Middlebury Drive	2022	2024	$330,000	$1,960,000	$2,290,000	5.3%	$121,370
MULT-0200/0300-01	--	Mullet Creek Erosion Control - Burnhamthorpe Road West to behind Woodchuck Lane	2022	2024	$450,000	$2,250,000	$2,700,000	5.3%	$143,100
CRED-0200-01	CRAMS site #29 & 30	Mississauga Road	2022	2024	$520,000	$2,920,000	$3,440,000	5.7%	$196,080
COOK-1700-01		Cooksville Creek Erosion Control - Highway 403 to Hurontario Street		2023			$300,000	4.7%	$14,100
WOLF-0100-01	--	Wolfedale Creek - Courrier Lane to Credit River	2023	2025	$120,000	$680,000	$800,000	3.3%	$26,400
COOK-0800-01	CCRS site #3e	Cooksville Creek Erosion Control - King Street East to north of Paisley Boulevard East	2023	2025	$140,000	$450,000	$590,000	4.7%	$27,730
MULT-2200-01	MCRS site #15a	Mullet Creek Erosion Control - Wabukayne Tributary, Upstream of CP Rail	2023	2025	$550,000	$3,360,000	$3,910,000	5.3%	$207,230
MULT-2200-02	MCRS site #15b	Parkway	2023	2025	$290,000	$1,680,000	$1,970,000	5.3%	$104,410
ETOB-0300-01	internal (2007 WCE)	Dundas St E	2023	2025	$140,000	$550,000	$690,000	5.7%	$39,330
CRED-2300-01	CRAMS site #1	Credit River Erosion Control - Downstream of Old Derry Rd	2023	2025	$40,000	$200,000	$240,000	5.7%	$13,680
CRED-0700-01	CRAMS site #20a	Credit River Erosion Control - Upstream of Dundas St W, adjacent to UTM Campus	2023	2025	$140,000	$820,000	$960,000	5.7%	$54,720
WOLF-0200-01	--	Wolfedale Creek Erosion Control - CPR to Dundas St.		2024			$1,120,000	3.3%	$36,960
CRED-0500-03	CRAMS site #25 reach 3	Credit River Erosion Control - Adjacent to Ostler Court		2024			$3,660,000	5.7%	$208,620
ETOB-0800-01	internal (2007 WCE)	Etobicoke Creek Erosion Control - Eglinton Avenue East to Hydro Corridor	2024	2026	$120,000	$320,000	$440,000	5.7%	$25,080
CAWT-0200-01	--	Cawthra Creek Erosion Control - Dellwood Park	2024	2026	$120,000	$560,000	$680,000	10.1%	$68,680
ETOB-0100-01	internal (2007 WCE)	Etobicoke Creek Erosion Control - Downstream of QEW, adjacent to Toronto Golf Club	2024	2026	$340,000	$1,320,000	$1,660,000	5.7%	$94,620
CRED-0500-02	CRAMS site #22	Credit River Erosion Control - Downstream of Dundas St W, behind Blythe Rd	2024	2026	$140,000	$700,000	$840,000	5.7%	$47,880
ETOB-0100-02	internal (2007 WCE)	Etobicoke Creek Erosion Control - Upstream of CNR, adjacent to Toronto Golf Club	2024	2026	$120,000	$410,000	$530,000	5.7%	$30,210
CRED-2600-01	--	(340m)	2024	2026	$140,000	$760,000	$900,000	5.7%	$51,300
COOK-1500-01	--	MVB (580m)	2024	2026	$110,000	$530,000	$640,000	4.7%	$30,080
LOYL-0600-01	--	Loyalist Creek erosion control, between Thornlodge Drive	2024	2026	$310,000	$1,810,000	$2,120,000	2.5%	$53,000
WOLF-0300-01	--	Wolfedale Creek Erosion Control - North and South of Central Parkway W		2025			$860,000	3.3%	$28,380
MARY-0200	--	Mary Fix Creek, erosion control works - behind Old River Rd	2025	2025			$1,180,000	5.7%	$67,260
COOK-0500-01	--	Avenue	2025	2027	$200,000	$1,660,000	$1,860,000	4.7%	$87,420
APPL-0200-01	--	Applewood Creek Erosion Control - CNR to Lakeshore Rd	2025	2027	$90,000	$450,000	$540,000	3.0%	$16,200
CRED-1400-01	CRAMS site #10	Credit River Erosion Control - Streetsville Public Cemetery	2025	2027	$140,000	$820,000	$960,000	5.7%	$54,720
MIMI-1400-01	--	Mimico Creek erosion control, between Morning Star Drive and Brandon Gate Drive	2025	2027	$100,000	$470,000	$570,000	4.7%	$26,790
MULT-1400/1500-01	MCRS site #10a & 10b	Mullet Creek Erosion Control - Derry Rd W to Argentia Rd	2025	2027	$670,000	$3,850,000	$4,520,000	5.3%	$239,560
CRED-0600-01	--	Credit River Erosion Control - South of Dundas Street		2026			$500,000	5.7%	$28,500

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SUMMARY OF EROSION CONTROL WORKS

A - EROSION CONTROL - IDENTIFIED WORKS

			Budget Timing		Cost Estimates			DC Costs	
Map ID#	Background Study*	Project Name / Location	EA & Design	Construction	EA & Design Cost	Construction Cost	Total Cost	DC Portion	DC Amount
CRED-0900-01	CRAMS site #17	Credit River Erosion Control - Behind Bridewell Court, downstream of Hwy 403	2026	2026			$610,000	5.7%	$34,770
TECU-0100-01	--	Tecumseh Creek Erosion Control - Lakeshore Rd. to Lake Ontario	2026	2026			$440,000	4.2%	$18,480
MULT-2300-01	MCRS site #16a	Mullet Creek Erosion Control - Aquitaine Tributary, Eastridge Road to CP Rail	2026	2028	$360,000	$2,170,000	$2,530,000	5.3%	$134,090
ETOB-2300-01	--	Etobicoke Creek erosion control, from Hwy. 410 to Tomken Rd	2027	2027			$1,330,000	5.7%	$75,810
CRED-1600-02	CRAMS site #7	Credit River Erosion Control - Upstream of Britannia Rd W, adjacent to St. Ives Way	2027	2027			$1,630,000	5.7%	$92,910
CRED-2400-01	CRAMS site #1-FP	Credit River Erosion Control - Upstream of Old Derry Rd	2027	2027			$300,000	5.7%	$17,100
MULT-1525-01	MCRS site #10c	Mullet Creek Erosion Control - Meadowvale Blvd to Derry Rd W	2027	2027			$1,590,000	5.3%	$84,270
CRED-1300-01	CRAMS site #11a	Credit River Erosion Control - Old Station Rd, upstream of Reid Dam	2028	2028			$1,250,000	5.7%	$71,250
MULT-1000-01	MCRS site #6c	Mullet Creek Erosion Control - Upstream of Tannery Road	2028	2028			$1,455,000	5.3%	$77,115
CRED-1700/1800-01	CRAMS site #3	Credit River Erosion Control - West of Creditview Rd, adjacent to Hollywell Ave	2028	2028			$1,000,000	5.7%	$57,000
MULT-1200-01	MCRS site #9b	Mullet Creek Erosion Control - Erin Mills Pkwy to Diversion Structure	2028	2028			$1,140,000	5.3%	$60,420
MULT-1300-01	MCRS site #9c & 9d	Mullet Creek Erosion Control - Argentia Rd to Erin Mills Pkwy	2028	2028			$1,650,000	5.3%	$87,450
CRED-0500-04	CRAMS site #5a/b-FP	Credit River Erosion Control - Mississauga Golf & Country Club	2028	2028			$1,350,000	5.7%	$76,950
CRED-1500-01	CRAMS site #8	Credit River Erosion Control - Amity Rd, downstream of Britannia Rd W	2028	2028			$1,500,000	5.7%	$85,500
MULT-1800/1900-01	MCRS site #12a & 12b	Mullet Creek Erosion Control - Quenippenon Tributary, Credit Valley Rd to Confluence	2028	2028			$1,350,000	5.3%	$71,550
MULT-1200-02	MCRS site #8b	Mullet Creek Erosion Control - Diversion Structure to CP Rail	2030	2030			$1,020,000	5.3%	$54,060

* Background Studies Include: CRAMS - Credit River Adaptive Management Strategy (2005), MCRS - Mullet Creek Rehabiltation Study (2001), Cooksville Creek Rehabilitation Study (1997), SCNCDS - Sawmill Creek Natural Channel Design Study (1995)

A - SUBTOTAL: **$142,825,000** **$4,771,045**

B - EROSION CONTROL - FUTURE WORKS

Map ID#	Background Study	Project Name / Location	EA & Design	Construction	Design Cost**	Construction Cost**	Total Cost	DC Portion	DC Amount
--	--	Various erosion control works for streams without detailed rehabilitation studies (approx. 27,239 m).	various	various	$12,840,893	$85,605,954	$98,446,847	5.4%	$5,316,130

** Esimtated construction costs based on approx. 27,239m at unit cost of $3,142 per metre. Design costs assumed to be approximately 15% of construction cost.

B - SUBTOTAL: **$98,446,847** **$5,316,130**

C - EROSION CONTROL - MINOR EROSION CONTROL WORKS

Map ID#	Background Study	Project Name / Location	EA & Design	Construction				DC Portion	DC Amount
--	--	Minor site-specific erosion control works	2019 to 2041	various	$80,000 for 22 years		$1,760,000	5.4%	$95,040

C - SUBTOTAL: **$1,760,000** **$95,040**

TOTAL EROSION CONTROL WORKS: **$243,031,847** **$10,182,215**

TABLE 2.2 – ESTIMATED FUTURE EROSION CONTROL WORKS

TABLE 2.2
ESTIMATED FUTURE EROSION CONTROL WORKS

Watercourse	Total Length (km)	Drainage Area (km2)	Rational*	Unstable(%) Estimated in '08	Length for Restoration (m) Estimated in '14	Restoration Works Undertaken '14-	City Project ID	Estimated Future Restoration
Applewood	2.70	4.5	ma	13%	171			171
Avonhead	3.60	1.7	other	22%	792			792
Birchwood Creek	4.20	3.5	ma	13%	546			546
Carolyn	3.80	5.3	ma	13%	494			494
Cawthra	1.00	2.0	other	22%	220			220
Chappell	3.00	1.9	ma	13%	390			390
Clearview	1.70	1.3	other	22%	374			374
Cooksville	24.60	35.3	n/a	n/a	n/a	1500	13-143,15-135, 14-141, 14-146, 17-010, 12-131	n/a
Credit	25.60	27.0	n/a	n/a	n/a	100	12-131	n/a
Cumberland Creek	0.30	0.5	other	22%	66			66
Etobicoke	20.40	47.8	n/a	n/a	n/a	100	18-002	n/a
Etobicoke Lakeshor	0.80	2.8	other	22%	176			176
Fletcher's	7.33	7.9	ma	13%	952			952
Joshua	0.20	0.2	BR	30%	60			60
Kenollie	3.80	2.2	MA-BR	22%	836			836
Lakeside	0.30	4.5	other	22%	66			66
Levi	2.44	2.3	ma	13%	317			317
Little Etobicoke	13.80	22.3	MA	43%	5,934			5,934
Lornewood	3.20	4.2	ma	13%	416			416
Loyalist	4.90	8.8	BR	30%	1,470	70	13-135	1,400
Mary Fix	9.20	6.5	MA-BR	22%	1,964			1,964
Meadowvale N	0.63	0.9	other	22%	139			139
Mimico	11.00	17.3	MA	43%	4,670			4,670
Moore	0.30	0.2	ma	13%	39			39
Mullet	20.70	27.7	n/a	n/a	n/a			n/a
Sawmill	8.77	15.8	MA-BR	22%	1,929			1,929
Serson	1.50	2.3	other	22%	330			330
Sheridan	5.02	7.4	BR	30%	986			986
Sixteen Mile Creek	5.80	9.5	MA	37%	2,146			2,146
Tecumseh	1.50	1.6	ma	13%	195			195
Turtle	2.90	2.6	ma	13%	377			377
Wolfedale	5.70	7.2	MA-BR	22%	1,254			1,254
				Total Length (m)	**27,309**			**27,239**

NOTES

*ma - modern alluvium bed with drainage area <10ha, MA - modern alluvium bed with drainage area >10ha, BR - exposed or thinly covered bedrock, MA-BR - bedrock and modern alluvium, other - alluvial bed composed of other local geology

n/a - not applicable. Restoration/erosion works for these watercourses have been estimated in individual, detailed studies.

TABLE 2.3 – SUMMARY OF CONSTRUCTION COSTS FOR RECENT CREEK EROSION / RESTORATION WORKS

TABLE 2.3
SUMMARY OF CONSTRUCTION COSTS FOR RECENT CREEK EROSION / RESTORATION WORKS

Project Title/Creek Name	*Location*	*Length of Works (m)*	*Tender/Construction Cost*	*Base Year for Cost Estimate*	*Adjusted Cost (2017$)*	*Unit Cost (2017$/m)*
Mary Fix Erosion Control Project - Harborn Rd. to Premium Way (City Project No. 12-138)	City of Mississauga	60	$73,295	2012	$81,987	$1,366.45
Sheridan Creek Stabilization - Clarkson Rd. to Meadow Wood Rd. (City Project No. 12-147)	City of Mississauga	400	$1,339,037	2013	$1,477,164	$3,692.91
Little Etobicoke Creek Erosion Control - Eglinton Ave. to Hwy. 401 (City Project No. 06-132)	City of Mississauga	275	$457,278	2010	$544,546	$1,980.17
Cooksville Creek Erosion Control - Atwater Ave. to CNR (City Project No. 07-138)	City of Mississauga	445	$907,920	2008	$1,130,954	$2,541.47
Credit River Erosion Control - North of Eglinton Ave. (City Project No. 06-134)	City of Mississauga	150	$383,360	2011	$449,189	$2,994.59
Cooksville Creek - QEW to Elaine Trail (City Project No. 17-004)	City of Mississauga	550	$1,200,000	2017/2018	$1,200,000	$2,181.82
Cooksville Creek - Rathburn to Meadows(City Project No. 17-008)	City of Mississauga	670	$2,490,000	2017/2018	$2,490,000	$3,716.42
Mary Fix Creek - South to Dundas(City Project No. 17-015)	City of Mississauga	160	$687,000	2017/2018	$687,000	$4,293.75
Levi Creek - North of Old Derry Road(City Project No. 17-014)	City of Mississauga	60	$156,000	2017/2018	$156,000	$2,600.00
Roseland Creek Phase I	City of Burlington	600	$1,500,858	2013	$1,655,677	$2,759.46
Roseland Creek Phase II	City of Burlington	400	$2,255,431	2013	$2,488,087	$6,220.22
Fourteen Mile Creek	Town of Oakville	495	$1,981,608	2012	$2,216,623	$4,478.03
West Don River-Restoration and Sanitary Sewer Alignment	City of Toronto	160	$779,770	2012	$872,249	$5,451.56
Spring Creek-Realignment of Etobicoke Creek-East Branch	Region of Peel	120	$141,504	2011	$165,802	$1,381.69
Pomona Mills Creek Erosion Restoration- Kirk &Henderson Sites	Town of Markham	210	$586,008	2009	$668,885	$3,185.17
Hager Creek	Region Of Halton	40	$80,000	2013	$88,252	$2,206.31
Dick's Creek West Branch-Aberdeen & Glendale	City of St. Catherines	140	$301,665	2013	$332,783	$2,377.02
					Avg. Cost ($/m):	**$3,142.77**

TABLE 2.4 – SUMMARY OF CONVEYANCE IMPROVEMENT WORKS

TABLE 2.4:
SUMMARY OF CONVEYANCE IMPROVEMENT WORKS

Map ID#	Finance Code	Background Study*	Project Name / Location	Type of Work	Budget Timing			Cost Estimates				Net Costs	DC Costs	
					EA & Design	Land Acquisition	Construction	EA & Design Cost	Construction Cost	Land Cost	Total Cost	Net Cost	DC Portion	DC Amount
	New		Meadowvale Business Park (North 16 District) - Tenth Line Drainage Diversion Solution	Channelization	2022		2022		$1,140,000		$1,140,000	$1,140,000	100.0%	$1,140,000
	New		Meadowvale Business Park (North 16 District) - Highway 401 Drainage Diversion Channel	Channelization	2022	2022		$340,000		$1,350,000	$1,690,000	$1,690,000	100.0%	$1,690,000
19-11	TWSD00017	--	Tecumseh Creek Culvert Improvements - CNR Culvert	Culvert Improvement	2022		2022		$4,220,000		$4,220,000	$4,220,000	4.2%	$177,240
20-05	New	--	Clearview Creek Channelization - Lakeshore Road to 800m Northerly	Channelization	2023	2023	2023		$2,610,000		$2,610,000	$2,610,000	100.0%	$2,610,000
17-01	TWSD00011	CCFRP site #EA2	Cooksville Creek Crossing Improvement - CP Rail	Culvert Improvement	2028		2028		$4,160,000		$4,160,000	$4,160,000	4.7%	$195,520
		Dundas Connects	Little Etobicoke Creek Drainage Improvements Dixie/Dundas Area (LETO-0300/ 0200-01)	Drainage			2021/22		$6,000,000		$6,000,000	$6,000,000	4.0%	$240,000
			Carolyn Creek Drainage Improvements - Various Locations	Drainage	2023		2023		$70,000		$70,000	$70,000	2.5%	$1,750
		Ninth Line Lands SWS	Ninth Line Hydro One Crossing	Drainage			2024		$1,785,481		$1,785,481	$1,785,481	100.0%	$1,785,481
COOK- QUEEN		Cooksville Flood Evaluation Study	Cooksville Creek Crossing Improvement - Queensway East	Culvert Improvement	2029		2029		$3,580,000		$3,580,000	$3,580,000	4.7%	$168,260
COOK-CNR		Cooksville Flood Evaluation Study	Cooksville Creek Crossing Improvement - CN Rail	Culvert Improvement	2029		2029		$2,740,000		$2,740,000	$2,740,000	4.7%	$128,780
COOK-QEW		Cooksville Flood Evaluation Study	Cooksville Creek Crossing Improvement - QEW Culvert	Culvert Improvement	2030		2030		$8,340,000		$8,340,000	$8,340,000	4.7%	$391,980
TOTAL CONVEYANCE IMPROVEMENT WORKS:											**$36,335,481**	**$36,335,481**		**$8,529,011**

NINTH LINE HYDRO ONE CROSSING

CONCEPTUAL COST ESTIMATE

10/16/2018

Notes: 1) This is a preliminary estimate based on conceptual plans dated May 2018 provided by the City of Mississauga
2) Based on the location of the crossing, it is assumed that the existing railway is non-active and not required full time flagging
3) It is assumed that the railway can be taken out of service for the duration of construction
4) It is assumed that the site access shown on the drawings is constructed with crusher run limestone and will be left in place after construction
5) it is assumed that excess material can be spread and stored onsite.

Item	Spec. No.	Description	Est. Quantity	Unit	Est. Unit Price ($)	Estimated Amount
		Site Preparation, Erosion Control and Removals				
1		Mobilization and Demobilization for Completion of Entire Project	1	l/s	$ 65,000.00	$ 65,000.00
2		Clearing and Grubbing	1	l/s	$ 1,500.00	$ 1,500.00
3		Silt Fence and erosion control, incl. dewatering required for staging	1	l/s	$ 25,000.00	$ 25,000.00
4		Construction of acess road and maintain (7m wide with 1.0m thick granular) to both abuttments	1	l/s	$ 95,000.00	$ 95,000.00
5		Remove existing culverts and railway ballast and disposal of offsite	1	l/s	$ 15,000.00	$ 15,000.00
6		Cut excess materail to match existing channel elevation and width (excess materail to spread onsite)	1	l/s	$ 12,000.00	$ 12,000.00
7		Staging and diversion channel to maintain creek flow	1	l/s	$ 13,500.00	$ 13,500.00
		Removal and Reinstatement of Rail				
8		Cut, remove and store onsite track segment required	1	l/s	$ 55,000.00	$ 55,000.00
9		Restore track including ballast, welding and ties	1	l/s	$ 95,000.00	$ 95,000.00
10		Adjustments to signal cable	1	l/s	$ 9,500.00	$ 9,500.00
		New bridge structure				
11		Excavate to proposed footing elevation for bridge piers and abutments in stages based on creek diversion requirements	450	m^3	$ 50.00	$ 22,500.00
12		Cast in place concrete abutments and piers, including formwork and reinforcement	200	m^3	$ 2,000.00	$ 400,000.00
13		Supply and place granular backfill and frost taper	200	m^3	$ 50.00	$ 10,000.00
14		Supply and install precast pre-stressed box girders	30	m	$ 5,000.00	$ 150,000.00
15		Supply and install cast in place concrete surface, safety railings, waterproofing, grate on walking surface on entire length of bridge	30	m	$ 1,500.00	$ 45,000.00
16		Supply and place ballast for track restoration full width	70	m	$ 400.00	$ 28,000.00
17		Adjustments to Existing Utilities	1	ea	$ 15,000.00	$ 15,000.00
		Site and Creek Restoration				
18		Modify creek to suit new bridge, incl. low flow	1	ls	$ 25,000.00	$ 25,000.00
19		Planting, sod and seeding	1	ls	$ 50,000.00	$ 50,000.00
					Estimated Amount	$ 1,132,000.00
					30% Contingency	$ 339,600.00
					15% Engineering	$ 169,800.00
					10% permit	$ 113,200.00
					Subtotal	$ 1,754,600.00
					HST(1.76%)	$ 30,880.96
					Total Estimated Amount	**$ 1,785,480.96**

TABLE 2.5 – SUMMARY OF STORMWATER MANAGEMENT WORKS

TABLE 2.5:
SUMMARY OF STORMWATER MANAGEMENT WORKS

A - New SWM Facilities

Map ID#	Background Study*	Pond Name / Location	Pond Type	Budget Timing			Cost Estimates				DC Costs	
				EA / Design	Land Acquisition	Construction	EA/Design Cost	Construction Cost	Land Cost	Total Cost	DC Portion	DC Amount
5708		Ninth Line Corridor - Northwest corner of Eglinton Avenue and Ninth Line.	new SWM pond - quality & quantity	2020	2020	2021	$140,000	$940,000	$6,090,000	$7,170,000	100.0%	$7,170,000
0401	Southdown MDP / MSWQCS Update	Clearview Creek SWM Pond #0401 - South of Lakeshore Road West	new SWM pond - quality	2020	n/a - City park	2021	$240,000	$2,950,000	n/a - City park	$3,190,000	100.0%	$3,190,000
5505		Ninth Line Corridor - west of Ninth Line, north of Derry Road	new SWM pond - quality & quantity	2021	2021	2022	$130,000	$880,000	$5,690,000	$6,700,000	100.0%	$6,700,000
5506		Ninth Line Corridor - west of Ninth Line, south of Hwy 401.	new SWM pond - quality & quantity	2022	2022	2022	$70,000	$450,000	$2,900,000	$3,420,000	100.0%	$3,420,000
5602		Ninth Line Corridor - west of Ninth Line and Doug Leavens Blvd. intersection	new SWM pond - quality & quantity	2022	2022	2023	$60,000	$380,000	$2,470,000	$2,910,000	100.0%	$2,910,000
4503	Meadowvale District MDP / MSWQCS Update	Meadowvale Area SWM Pond #4503 - North of Hwy 401, East of Credit River	new SWM pond - quantity & quality	2027	n/a - floodplain lands	2027	$130,000	$850,000	n/a - floodplain lands	$980,000	100.0%	$980,000
0402	Southdown MDP/ MSWQCS Update	Avonhead Creek SWM Pond #0402 - North of Lakeshore Rd W, East of Hazelhurst Rd	new SWM pond - quality	2028	2028	2028	$520,000		$2,160,000	$2,680,000	100.0%	$2,680,000
0403	Southdown MDP/ MSWQCS Update	Lakeside Creek SWM Pond #0403 - Lakeshore Rd W at Clarkson WWTP	new SWM pond - quality & quantity	2029	2029	2029	$930,000		$2,270,000	$3,200,000	100.0%	$3,200,000
1802		Sheridan Park Corporate Centre - Speakman Drive, Northeast of Winston Churchill Boulevard and QEW (Dev't driven with municipal drng)	new SWM pond - quality & quantity	2030	2030	2030	$940,000	$6,260,000	$33,990,000	$41,190,000	6.5%	$2,677,350
n/a		Additional Growth-related SWM projects	new SWM pond	2030	2030	2030		$3,500,000		$3,500,000	100.0%	$3,500,000
A - SUBTOTAL:										**$74,940,000**		**$36,427,350**

B - Stormwater Quality Retrofits

3602	MSWQCS Update	Retrofit - Little Etobicoke Creek Timberlea SWM Pond #3602	retrofit of quantity pond for quality	2020	n/a - retrofit	2021	$600,000	$5,000,000		$5,600,000	4.0%	$224,000
5001	MSWQCS Update	SWM Quality Retrofit - Etobicoke Creek Storm Outfall - Derry Road East and Dixie Road	retrofit of ex. storm outfall - quality	2023	n/a - retrofit	2023	$940,000			$940,000	5.7%	$53,580
3101	MSWQCS Update	Retrofit - Credit River Storm Outfall - Wellsborough Place and Tillingham Gardens	retrofit of ex. storm outfall - quality	2025	n/a - retrofit	2025	$5,200,000			$5,200,000	5.7%	$296,400
4506	MSWQCS Update	Credit River SWM Pond #4506 - Creditview Road & Argentia Road	retrofit of ex. storm outfall	2029	2029	2029	$5,490,000		$10,760,000	$16,250,000	5.7%	$926,250
4505		Retrofit - Credit River Storm Outfall - Hwy 401 and Creditview Rd	retrofit of ex. storm outfall	2030	2030	2030	$6,860,000		$7,110,000	$13,970,000	5.7%	$796,290
B - SUBTOTAL:										**$41,960,000**		**$2,296,520**

C - New Cooksville Creek Flood Relief Works

2101	Cooksville Creek Flood Evaluation Study	Cooksville Creek Pond #2101 - Mississauga Valley Boulevard and Central Parkway East (City Centre Outlet)	flood relief		2019/20	2020/21		$7,800,000	$6,980,000	$14,780,000	4.7%	$694,660
3604	Cooksville Creek Flood Evaluation Study	Cooksville Creek Flood Storage Facility - Bristol Rd E, west of Kennedy Rd (Frank McKechnie Community Centre)	flood relief		n/a	2020/21		$7,330,000	n/a	$7,330,000	4.7%	$344,510
2102	Cooksville Creek Flood Evaluation Study	Cooksville Creek Flood Storage Facility - McKenzie Park, Mississauga Valley Blvd	flood relief		n/a	2022/23		$16,950,000	n/a	$16,950,000	4.7%	$796,650
2103	Cooksville Creek Flood Evaluation Study	Cooksville Creek Flood Storage Facility - Mississauga Valley	flood relief		n/a	2020		$4,190,000	n/a	$4,190,000	4.7%	$196,930
3703	Cooksville Creek Flood Evaluation Study	Cooksville Creek Flood Storage Facility - Greyshale Park, Heritage Hills Blvd	flood relief	2021	n/a	2023	$260,000	$3,450,000	n/a	$3,710,000	4.7%	$174,370
2805	Cooksville Creek Flood Evaluation Study	Cooksville Creek Flood Storage Facility - Huron Heights Park, Central Parkway E, north of Hwy 403	flood relief	2021	n/a	2023	$210,000	$2,820,000	n/a	$3,030,000	4.7%	$142,410
2903	Cooksville Creek Flood Evaluation Study	Cooksville Creek Flood Storage Facility - Heritage Hills Park, Huntington Ridge Drive	flood relief	2022	n/a	2024	$500,000	$4,850,000	n/a	$5,350,000	4.7%	$251,450
2902	Cooksville Creek Flood Evaluation Study	Cooksville Creek Flood Storage Facility - Hydro Corridor, north of Hwy 403, West of Hurontario Street	flood relief	2024	2026	2027	$440,000	$5,040,000	$11,050,000	$16,530,000	4.7%	$776,910
2804	Cooksville Creek Flood Evaluation Study	Cooksville Creek Flood Storage Facility - Hydro Corridor, north of Hwy 403, east of Hurontario Street	flood relief	2024	2025	2027	$290,000	$3,340,000	$7,230,000	$10,860,000	4.7%	$510,420
C - SUBTOTAL:										**$82,730,000**		**$3,888,310**
TOTAL STORMWATER MANAGEMENT CONTROL WORKS:										**$199,630,000**		**$42,612,180**

TABLE 2.6 – SUMMARY OF STORM SEWER OVERSIZING WORKS

TABLE 2.6
SUMMARY OF STORM SEWER OVERSIZING WORKS

Storm Sewer Oversizing and Timing	Notes	Cost	DC portion	DC amount
Storm Sewer Oversizing - Various Locations (2019-2041)	$270,000 per year for 22 years	$5,940,000	100.0%	$5,940,000
LRT Storm Sewer Improvements (2019/20/21)	Sewer oversizing costs calculated as $2.84M	$2,840,000	100.0%	$2,840,000
Mississauga Road storm sewer oversizing	Trunk sewer oversizing by "West Village" at 70 Mississauga Road	$1,999,601	100.0%	$1,999,601
South of Eglinton Ave. btwn Ninth Line & Ridgeway Dr.	Churchill Meadows, N'hood 407. Storm sewers for future dev't north of Eglinton Ave.	$241,101	100.0%	$241,101
Lakeview Community storm sewer oversizing	Trunk sewer oversizing by "Lakeview Community Partners Ltd."	$2,593,885	100.0%	$2,593,885
TOTAL STORM SEWER OVERSIZING WORKS:		**$13,614,587**		**$13,614,587**

MISSISSAUGA ROAD - STORM SEWER OVERSIZING

PRELIMINARY COST ESTIMATE

4/30/2019

Notes: 1) This is a preliminary estimate based on drawing provided by the City of Mississauga as modified by KSGS.
2) Manhole size modified to suit proposed sewers.
3) Unit rates are estimated based on 2018 land development projects.
4) Storm Sewer on Street F based on Urbantech conceptual design provided by City of Mississauga April 30 19

Item	Spec. No.	Description	Est. Quantity	Unit	Est. Unit Price ($)	Estimated Amount
		Proposed Design - Ultimate Sewer:				
1		1800X900mm Concrete Box Culvert	342.9	m	$ 2,200.00	$ 754,380.00
2		3000X1200mm Concrete Box Culvert	244.3	m	$ 3,500.00	$ 855,050.00
3		3000mm dia. Manholes - 217, 216, 215, 214	5	ea	$ 40,000.00	$ 200,000.00
4		3.9x2.4m Box Manholes - 202, 201	2	ea	$ 63,000.00	$ 126,000.00
5		Headwall - to accommodate 3000x1200 Box Culvert Sewer	1	ea	$ 54,000.00	$ 54,000.00
6		Outfall treatment at **Mississauga Road**	1	LS	$ 200,000.00	$ 200,000.00
7		2400X1200mm Concrete Box Culvert	133.6	m	$ 2,850.00	$ 380,760.00
8		3.0x1.8m Box Manhole - Upstream of Street F outfall	2	ea	$ 58,000.00	$ 116,000.00
9		Headwall - to accommodate 2400x1200 Box Culvert Sewer	1	ea	$ 50,000.00	$ 50,000.00
10		Outfall treatment at **Street F**	1	LS	$ 150,000.00	$ 150,000.00
					Sub-total (A)	$ 2,886,190.00
		Base Design - 1500mm Dia Sewer:				
1		1500mm dia. storm sewer	720.8	m	$ 1,380.00	$ 994,704.00
2		2400mmdia. Manholes - 217, 216, 215,214	6	ea	$ 16,500.00	$ 99,000.00
3		3000mmdia. Manholes - 202, 201	3	ea	$ 24,500.00	$ 73,500.00
4		Headwall - to accommodate 1500mm dia. Sewer	2	ea	$ 18,900.00	$ 37,800.00
5		Outfall treatment	2	LS	$ 100,000.00	$ 200,000.00
					Sub-total (B)	$ 1,405,004.00

Subtotal Oversizing Project Cost (A-B)	**$ 1,481,186.00**
20% Contingency	$ 296,237.20
15% Engineering	$ 222,177.90
Total Estimated Oversizing Project Cost	**$ 1,999,601.10**

LAKEVIEW COMMUNITY - STORM SEWER OVERSIZING
PRELIMINARY COST ESTIMATE

4/30/2019

Notes: 1) This estimate is based on Urbantech conceptual design provided by City of Mississauga April 30 19
2) Manhole size modified to suit proposed sewers.
3) Unit rates are estimated based on 2018 land development projects.

Item	Spec. No.	Description	Est. Quantity	Unit	Est. Unit Price ($)	Estimated Amount
		Proposed Design - Ultimate Sewer:				
1		1800mm dia. Concrete sewer	115.4	m	$ 2,200.00	$ 253,880.00
2		1800X1200mm Concrete Box Culvert	226	m	$ 2,400.00	$ 542,400.00
3		2400X1200mm Concrete Box Culvert	144.0	m	$ 2,800.00	$ 403,200.00
4		3000X1200mm Concrete Box Culvert	318.7	m	$ 3,500.00	$ 1,115,450.00
5		3600X1500mm Concrete Box Culvert	82.7	m	$ 4,500.00	$ 372,150.00
6		3000mm dia. Manholes	5	ea	$ 40,000.00	$ 200,000.00
7		Box Manholes	5	ea	$ 63,000.00	$ 315,000.00
8		Headwall - to accommodate 3600x1500 Box Culvert Sewer	1	ea	$ 75,000.00	$ 75,000.00
9		Outfall treatment at the lake	1	LS	$ 200,000.00	$ 200,000.00
					Sub-total (A)	$ 3,477,080.00
		Base Design - 1500mm Dia Sewer:				
1		1500mm dia. storm sewer	886.8	m	$ 1,380.00	$ 1,223,784.00
2		2400mmdia. Manholes - 217, 216, 215,214	4	ea	$ 16,500.00	$ 66,000.00
3		3000mmdia. Manholes - 202, 201	6	ea	$ 24,500.00	$ 147,000.00
4		Headwall - to accommodate 1500mm dia. Sewer	1	ea	$ 18,900.00	$ 18,900.00
5		Outfall treatment	1	LS	$ 100,000.00	$ 100,000.00
					Sub-total (B)	$ 1,555,684.00

Subtotal Oversizing Project Cost (A-B)	**$ 1,921,396.00**
20% Contingency	$ 384,279.20
15% Engineering	$ 288,209.40
Total Estimated Oversizing Project Cost	**$ 2,593,884.60**

TABLE 2.7 – BACKGROUND STUDIES AND MONITORING

TABLE 2.7
BACKGROUND STUDIES AND MONITORING

Study and Timing	Unit Cost	Cost	DC portion	DC amount
Development Charges Study Updates (2023, 2028, 2033, 2038)	$80,000 for each update =	$320,000	100.0%	$320,000
Annual Monitoring and Studies of Various SWM Ponds / Various Locations *	$80,000 per year for 22 years =	$1,760,000	5.4%	$95,040
Watercourse Minor Works *	$80,000 per year for 22 years =	$1,760,000	5.4%	$95,040
SWM Quality Retrofit - Etobicoke Creek Storm Outfall - Britannia Road East and Netherhart Road (2024) **	$300,000	$300,000	5.7%	$17,100
Watercourse Erosion and Rehabilitation Studies (2023) *	$750,000	$750,000	5.4%	$40,500
Mary Fix Creek Flood Evaluation Study (2021) **	$260,000	$260,000	5.7%	$14,820
Mississauga Stormwater Management MasterPlan (2019) *	$750,000	$750,000	5.4%	$40,500
Mississauga Stormwater Quality Control Strategy Update (2023, 2028) *	400000 for each update	$800,000	5.4%	$43,200
Serson Creek & Applewood Creek Flood Evaluation Study (2019) ***	$250,000	$250,000	2.95%	$7,375
TOTAL - BACKGROUND STUDIES AND MONITORING:		**$6,950,000**		**$673,575**

*** DC portion based .on total watershed %**
**** DC .portion based on watershed % related to the study**
***** DC portion based on average % of Serson and Applewood Watersheds**

TABLE 3.1 – SUMMARY OF AVAILABLE DEVELOPMENT LANDS

TABLE 3.1
SUMMARY OF AVAILABLE DEVELOPMENT LANDS

Watershed	Total Area	Vacant Lands	Occupied Lands	Redevelopment Potential @ 2.5%[1]	Total Vacant Land + Redevelopment Potential	% by Watershed* + Redevelopment
APPLEWOOD CREEK	450.33	2.42	447.91	11.20	13.62	3.0%
AVONHEAD CREEK	166.54	22.33	144.21	3.61	25.93	15.6%
BIRCHWOOD CREEK	351.78	2.23	349.55	8.74	10.97	3.1%
CAROLYN CREEK	526.23	-	526.23	13.16	13.16	2.5%
CAWTHRA CREEK	206.58	16.09	190.49	4.76	20.85	10.1%
CHAPPELL CREEK	185.81	-	185.81	4.65	4.65	2.5%
CLEARVIEW CREEK	133.20	18.66	114.54	2.86	21.52	16.2%
COOKSVILLE CREEK	3,528.85	80.48	3,448.37	86.21	166.69	4.7%
CREDIT RIVER	2,700.01	88.07	2,611.93	65.30	153.37	5.7%
CUMBERLAND CREEK	54.44	-	54.44	1.36	1.36	2.5%
ETOBICOKE CREEK	4,781.51	158.99	4,622.51	115.56	274.56	5.7%
ETOBICOKE LAKESHORE	284.80	-	284.80	7.12	7.12	2.5%
FLETCHER CREEK	785.08	68.05	717.03	17.93	85.97	11.0%
JOSHUA CREEK	16.73	-	16.73	0.42	0.42	2.5%
KENOLLIE CREEK	216.63	-	216.63	5.42	5.42	2.5%
LAKESIDE CREEK	451.04	54.87	396.17	9.90	64.78	14.4%
LEVI CREEK	225.47	-	225.47	5.64	5.64	2.5%
LITTLE ETOBICOKE CREEK	2,226.12	33.54	2,192.58	54.81	88.35	4.0%
LORNEWOOD CREEK	421.78	4.99	416.79	10.42	15.40	3.7%
LOYALIST CREEK	878.24	-	878.24	21.96	21.96	2.5%
MARY FIX CREEK	653.00	21.19	631.81	15.80	36.99	5.7%
MEADOWVALE NORTH	92.94	-	92.94	2.32	2.32	2.5%
MIMICO CREEK	1,731.29	38.22	1,693.07	42.33	80.54	4.7%
MOORE CREEK	18.63	-	18.63	0.47	0.47	2.5%
MULLET CREEK DOWNSTREAM	*1,158.12*	-	*1,158.12*	*28.95*		*0.0%*
MULLET CREEK UPSTREAM	*1,612.88*	-	*1,612.88*	*40.32*		*0.0%*
Total Mullet Creek Downstream & Upstream	**2,771.01**	**78.79**	**2,771.01**	**69.28**	**148.06**	5.3%
NINTH LINE		32.66	32.66	0.82	33.48	100.0%
OAKVILLE	67.62	15.97	51.65	1.29	17.26	25.5%
PORT CREDIT	96.65	-	96.65	2.42	2.42	2.5%
PORT CREDIT WEST	167.00	-	167.00	4.18	4.18	2.5%
SAWMILL CREEK	1,583.88	31.54	1,552.34	38.81	70.35	4.4%
SERSON CREEK	234.58	0.91	233.67	5.84	6.76	2.9%
SHERIDAN CREEK	740.84	30.06	710.78	17.77	47.83	6.5%
SIXTEEN MILE CREEK	946.08	49.10	896.98	22.42	71.52	7.6%
TECUMSEH CREEK	162.54	2.85	159.69	3.99	6.84	4.2%
TURTLE CREEK	256.84	6.30	250.54	6.26	12.57	4.9%
WOLFEDALE CREEK	719.50	6.09	713.42	17.84	23.92	3.3%
Total	**28,833.55**	**864.39**	**28,113.27**	**702.83**	**1,567.22**	**5.4%**

(1) Redevelopment potential at 2.5% has been applied to the occupied lands throughout the identified watersheds. This amount is intended to represent an average across the entire City.

TABLE 4.1 – 2019 STORM DRAINAGE DEVELOPMENT CHARGES

TABLE 4.1
2019 STORM DRAINAGE DEVELOPMENT CHARGES

	2019 DC
1 - EROSION CONTROL WORKS	
A - EROSION CONTROL - IDENTIFIED WORKS	$4,771,045
B - EROSION CONTROL - FUTURE WORKS	$5,316,130
C - MINOR EROSION CONTROL	$95,040
SUBTOTAL	**$10,182,215**
2 - CONVEYANCE (CHANNELIZATION. CULVERT IMPROVEMENTS)	**$8,529,011**
3 - STORMWATER MANAGEMENT	
A - STORMWATER MANAGEMENT FACILITIES - NEW FACILITIES:	$36,427,350
B - STORMWATER QUALITY RETROFITS:	$2,296,520
C - NEW COOKSVILLE CREEK FLOOD RELIEF WORKS	$3,888,310
SUBTOTAL	**$42,612,180**
4 - STORM SEWER OVERSIZING	**$13,614,587**
5 - BACKGROUND STUDIES AND MONITORING:	**$673,575**
TOTAL PROGRAM	**$75,611,567**
LESS RESERVES:	
(STORM DRAINAGE DC; ACT 31350)	$32,452,965
(WATER QUALITY ACT; 37513)	$2,172,871
(SECTION 14 LOT LEVY-MAJOR STORM IMPROVEMENT LEVT; ACT 35124)	$17,923,179
TOTAL RESERVES:	**$52,549,015**
TOTAL STORMWATER MANAGEMENT CAPITAL COSTS TO BE RECOVERED THROUGH DEVELOPMENT CHARGES	**$23,062,552**
FUTURE DEVELOPMENT AREA (NET)	**1,567 ha**
UNIT DEVELOPMENT CHARGE	**$14,718 /ha**

APPENDIX A

City Council Resolution – Sept.13, 2017

Jim Tovey

MOTION: CONSIDER LOW-IMPACT DEVELOPMENT (LID) TECHNIQUES IN THE SCOPE OF THE STORMWATER DEVELOPMENT CHARGE BACKGROUND STUDY FOR THE 2019 DEVELOPMENT CHARGE BY-LAW

WHEREAS stormwater management helps to minimize the impact of urbanization by reducing the risks of flooding and erosive damages to our streams and structures as well as improving water quality;

AND WHEREAS low impact development (LID) is a stormwater management approach that encompasses a suite of innovative techniques, sustainable technologies and green infrastructure that can infiltrate, store, evaporate and/or detain stormwater runoff;

AND WHEREAS the use of LID techniques such as bio-swales, stormwater canals, permeable surfaces and others have been proven effective in mitigating the environmental impacts of urbanization and are gaining support by practitioners as viable stormwater management approaches;

AND WHEREAS the Ministry of the Environment and Climate Change recognizes the importance of LID and is currently developing a Low Impact Development Stormwater Management Guidance Manual;

AND WHEREAS the use of LID techniques is consistent with the CONNECT and LIVING GREEN pillars of the City's Strategic Plan;

AND WHEREAS the City has successfully implemented several LID projects and has numerous others currently in progress;

AND WHEREAS the City's Stormwater Charge funds the cost of operating, maintaining and upgrading the stormwater drainage system;

AND WHEREAS the City's development charges fund stormwater management projects needed to support development growth as identified and projected in the Development Charges Background Study – Storm Drainage Component;

AND WHEREAS bio-swales and other LID techniques are not accounted for in the City's most recent Development Charges Background Study – Storm Drainage Component prepared in 2014;

AND WHEREAS the next update to the Development Charges Background Study – Storm Drainage Component is scheduled to be completed in 2019 in support of the City's Development Charges Update in 2019;

NOW THEREFORE BE IT RESOLVED THAT LID options be considered and evaluated and, where appropriate, included in the scope of the upcoming Development Charges Background Study – Storm Drainage Component in support of the City's Development Charges Update in 2019.