CITY OF HAMILTON

2011 DEVELOPMENT CHARGE BACKGROUND STUDY FOR WATER, WASTEWATER, STORM WATER AND GO TRANSIT SERVICES

FOR PUBLIC REVIEW

IN ASSOCIATION WITH

AECOM

and

AMEC EARTH & ENVIRONMENTAL

MAY 20, 2011

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Planning for growth

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EXECUTIVE SUMMARY

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1. The report provided herein represents the Development Charge Background Study for the City of Hamilton required by the *Development Charges Act* (DCA). This report has been prepared in accordance with the methodology required under the DCA. The contents include the following:

    - Chapter 1 – Overview of the legislative requirements of the Act;
    - Chapter 2 – Review of present DC policies of the City;
    - Chapter 3 – Summary of the residential and non-residential growth forecasts for the City;
    - Chapter 4 – Approach to calculating the Development Charge;
    - Chapter 5 – Review of historic service standards and identification of future capital requirements to service growth and related deductions and allocations;
    - Chapter 6 – Calculation of the development charges;
    - Chapter 7 – Development charge policy recommendations and rules; and
    - Chapter 8 – By-law implementation.

2. Development charges provide for the recovery of growth-related capital expenditures from new development. The *Development Charges Act* is the statutory basis to recover these charges. The methodology is detailed in Chapter 4. A simplified summary is provided below:

    1) Identify amount, type and location of growth;
    2) Identify servicing needs to accommodate growth;
    3) Identify capital costs to provide services to meet the needs;
    4) Deduct:
        - Grants, subsidies and other contributions;
        - Benefit to existing development;
        - Statutory 10% deduction (soft services);
        - Amounts in excess of 10 year historic service calculation;
        - DC Reserve Funds (where applicable);
    5) Net costs then allocated between residential and non-residential benefit;
    6) Net costs divided by growth to provide the DC charge.

3. The growth forecast (Chapter 3) on which the City-wide development charge (GO Transit) is based, projects the following increases in population, housing and non-

residential floor area for the ten year (mid 2011-mid 2021) period. The growth forecast on which the City-wide development charge (roads & related, stormwater, water and wastewater services) are based, projects the following increases in population, housing units and non-residential floor area for a twenty year planning period (mid 2011-mid 2031).

Measure	10 Year Mid 2011 - Mid 2020	Build Out Mid 2011 - Mid 2031
(Net) Population Increase	30,583	121,514
Residential Unit Increase	24,750	71,787
Non-Residential Gross Floor Area Increase (ft^2)	18,194,600	38,831,300

4. The City's present City-wide Development Charge By-law No. 09-143 was passed on June 24, 2009, came into force on July 6, 2009 and will expire on July 6, 2014. The City amended by-law 09-143 with by-law No. 09-228, which was passed and came in to force on November 11, 2009. The City's present Water and Wastewater Development Charge By-law No. 09-144 was passed on June 24, 2009, came into force on July 6, 2009 and will expire on July 6, 2011. The City amended by-law 09-144 with by-law No. 09-229, which was passed and came in to force on November 11, 2009.

5. The City passed By-law No. 06-174 for Go Transit Services on June 28, 2006, which came into force on July 6, 2006 and will expire July 6, 2011. The Go Transit Services Development Charges are being updated at this time.

6. The City is undertaking a development charge public process and anticipates passing one development charge by-law for Water, Wastewater, Stormwater and GO Transit Services in advance of the expiry date of by-laws 06-174 and 09-144 (as amended by No. 09-229). As well, by-law 09-143 (as amended by by-law 09-228) will be amended to remove Storm Water Drainage and Controls Services. The mandatory public meeting is set for June 9, 2011 with adoption of the by-law anticipated for June 15, 2011.

7. The municipal-wide development charges currently in effect for urban area charges and municipal-wide charges is $26,182 for single detached dwelling units. The GO Transit charge for single detached dwelling units is $225. The Non-Residential municipal-wide development charges currently in effect for urban area charges and municipal-wide charges, excluding GO Transit, currently in effect are $19.00 per ft^2. The City also imposes area specific development charges, residential and non-residential, in Binbrook and Dundas/Waterdown which provide for recovery of costs related to specific development agreements.

8. This report has undertaken a recalculation of the development charge based on future identified needs (presented in Schedule ES-1 for Residential and Non-Residential) on a City-wide basis for GO Transit services. This report has also undertaken a recalculation of the urban area development charge for water, wastewater and stormwater services. The calculated city-wide development charge for GO Transit service for a single-detached unit charge is $215. The calculated urban area charges for water, wastewater and storm water drainage and control services for a single-detached unit charge is $16,529. The calculated non-residential development charges for city wide services are $7.56 per ft² of gross floor area. These rates will be set before Council for their consideration. Table ES-2 provides for the calculated full DC charges, including the recalculation of the development charges for water, wastewater, stormwater and GO Transit.

9. The *Development Charges Act* requires a summary to be provided relative to the gross capital costs and the net costs to be recovered over the life of the by-law. This calculation is provided by service and is presented in Table 6-4. A summary of these costs is provided below:

Total gross expenditures planned over the next five years	$	522,491,555
Less:		
Benefit to existing development	$	70,164,897
Post planning period benefit	$	235,000
Mandatory 10% deduction for GO Transit services	$	238,783
Grants, subsidies and other contributions	$	74,904,221
Net Costs to be recovered from development charges	**$**	**376,948,654**

Hence, $145.78 million (or an annual amount of $29.16 million) will need to be contributed from taxes and rates, or other sources and $235,000 will be included in subsequent DC Study updates.

Based on the above capital listing, the City plans to spend $522.49 million over the next five years of which $376.95 million (72%) is recoverable from development charges. Of this net amount, $272.46 million is recoverable from residential development and $104.49 million from non-residential development. It is noted also that any exemptions or reductions in the charges would reduce this recovery further.

10. Considerations by Council – The background update study represents the service needs arising from residential and non-residential growth over the forecast periods. Services related to water, wastewater and stormwater are calculated based on a 21 year forecast. GO Transit service development charges are calculated based on a 10 year forecast. Council will consider the findings and recommendations provided for in the report and, in conjunction with public input, approve such policies and rates it deems appropriate.

These directions will refine the draft DC by-law which is included as Appendix H. These decisions may include:

- adopting the charges and policies recommended herein;
- considering additional exemptions to the by-law;
- considering reductions in the charge by class of development (obtained by removing certain services on which the charge is based and/or by a general reduction in the charge); and
- consider the timing of collection (i.e. whether some or all components shall be received at the time of building permit issuance or earlier).

TABLE ES-1

SCHEDULE OF DEVELOPMENT CHARGES

Service	RESIDENTIAL					NON-RESIDENTIAL
	Single and Semi-Detached Dwelling	Apartments - 2 Bedrooms +	Apartments - Bachelor and 1 Bedroom	Other Multiples	Residential Facility Dwelling	(per ft² of Gross Floor Area)
Municipal Wide Services:						
GO Transit	215	133	89	154	70	0.00
Total Municipal Wide Services	**215**	**133**	**89**	**154**	**70**	**0.00**
Urban Services						
Stormwater Drainage and Control Services	4,669	2,892	1,928	3,347	1,515	0.57
Wastewater Services	8,674	5,373	3,582	6,218	2,815	5.11
Water Services	3,186	1,973	1,316	2,283	1,034	1.88
Total Urban Services	**16,529**	**10,238**	**6,826**	**11,848**	**5,364**	**7.56**

TABLE ES-2

CITY OF HAMILTON

2011 CALCULATED DEVELOPMENT CHARGES

Service	Residential					Non-Residential (per ft².)
	Single & Semi Detached	Multiples	Apartments with >= 2 Bedrooms	Apartments with < 2 Bedrooms	Residential Facility Dwelling (per bedroom)	
Service Componet						
Urban Area Charges:						
Water Services	3,186	1,973	1,316	2,283	1,034	1.88
Wastewater Services	8,674	5,373	3,582	6,218	2,815	5.11
Stormwater Drainage and Control Services	4,669	2,892	1,928	3,347	1,515	0.57
Total Urban Area Charges	**16,529**	**10,238**	**6,826**	**11,848**	**5,364**	**7.56**
Municipal Wide Charges:						
Services Related to a Highway	5,950	4,264	3,650	2,440	1,755	6.37
Airport	80	78	68	45	32	0.09
Transit	218	134	116	77	56	0.24
Fire Protection Services	289	207	178	119	85	0.19
Police Services	252	181	155	103	75	0.17
Outdoor Recreation Services	800	574	491	329	236	0.05
Indoor Recreation Services	1,030	739	632	423	304	0.06
Library Services	367	263	225	150	108	0.02
Administration	278	199	171	114	81	0.28
Ambulance	16	11	10	7	5	0.01
Homes for the Aged	4	3	2	2	1	-
Health Services	38	27	24	16	12	-
Social & Child Care Services	46	33	28	19	14	0.01
Social Housing	455	327	280	186	134	-
Total Municipal Wide Charges	**9,823**	**7,040**	**6,030**	**4,030**	**2,898**	**7.49**
GO Transit (City Wide)	215	133	89	154	70	-
Total Urban Area Charges	**26,567**	**17,411**	**12,945**	**16,032**	**8,332**	**15.05**

Services Recalculated within the 2011 Background Study

Note: Special Area Charges are in addition to the rates presented above

1. INTRODUCTION

1. INTRODUCTION

1.1 Purpose of this Document

This background study has been prepared pursuant to the requirements of the *Development Charges Act, 1997* (s.10), and accordingly, recommends new development charges and policies for the City of Hamilton.

The basis for the calculation of the City's existing schedule of residential and non-residential development charges is documented in the "City of Hamilton Development Charge Study," dated May 20, 2009, followed by Addendum 1 on May 29, 2009 and Addendum 2 on June 22, 2009. Those reports provide the supporting documentation for By-law 09-143 and 09-144, passed on June 24, 2009, and came into force on July 6, 2009. By-law 09-143, as amended, will expire on July 6, 2014 and by-law 09-144, as amended, will expire on July 6, 2011. The GO Transit development charges is documented in the "City of Hamilton Development Charge Background Study for the GO Transit Service," dated June 5, 2006, this report provided the supporting documentation for By-law 06-174, which came into force on July 6, 2006 and will expire on July 6, 2011.

The City retained Watson & Associates Economists Ltd. (Watson), in association with AECOM and AMEC (formerly Philips Engineering), to undertake the Development Charges Update study process in 2010. The Consulting Team worked with staff of the City in preparing this DC analysis and policy recommendations. Further, the Consulting Team has met with the Stakeholders Committee (made up of citizens, representatives from the commercial, industrial and homebuilder markets, council members and staff), to review and gain input into the development charge policies and rules.

This Development Charge Background Study, containing the proposed new Development Charge by-law for Water, Wastewater, Stormwater & GO Transit Services and the proposed amendment to by-law 06-143, to remove the Storm Water Drainage and Control Service, will be distributed to members of the public in order to provide interested parties with sufficient background information on the legislation, the study's recommendations and an outline of the basis for these recommendations.

This report has been prepared, in the first instance, to meet the statutory requirements applicable to the City's Development Charge Background Study, as summarized in Chapter 4. It also addresses the requirement for "rules" (contained in Chapter 7) and the proposed by-laws to be made available as part of the approval process (included under separate cover).

In addition, the report is designed to set out sufficient background on the legislation (Chapter 4), current City DC policy (Chapter 2) and the policies underlying the proposed by-laws, to make the exercise understandable to those who are involved.

Finally, it addresses post-adoption implementation requirements (Chapter 8) which are critical to the successful application of the new policy.

The Chapters in the report are supported by Appendices containing the data required to explain and substantiate the calculation of the charge. A full discussion of the statutory requirements for the preparation of a background study and calculation of a development charge is provided herein.

1.2 Summary of the Process

The Public Meeting required under section 12 of the *Development Charges Act, 1997*, has been scheduled for June 9, 2011 in the City of Hamilton Council Chambers. Its purpose is to present the study to the public and to solicit public input. The meeting is also being held to answer any questions regarding the study's purpose, methodology and the proposed modifications to the City's development charges.

In accordance with the legislation, the background study and proposed DC by-law will be available for public review on May 20, 2011.

The process to be followed in finalizing the report and recommendations includes:

- consideration of responses received prior to, at or immediately following the Public Meeting;
- finalization of the report and Council consideration of the by-laws on subsequent to the public meeting.

Figure 1-1 outlines the proposed schedule to be followed with respect to the development charge by-law adoption process.

FIGURE 1-1
SCHEDULE OF KEY DEVELOPMENT CHARGE PROCESS DATES FOR THE CITY OF HAMILTON

1. Data collection	2010 – Mid 2011
2. City Staff/Consultant Team Review	January – March, 2011
3. Stakeholders Committee Meeting No. 1 – Water, Wastewater & Stormwater DC	April 18, 2011
4. Preparation of Draft Study	May, 2011
5. Review of draft study with Staff	May, 2011
6. Stakeholders Committee Meeting No. 2 – Water, Wastewater & Stormwater DC	May 13, 2011
7. Public Meeting Ad placed in newspaper(s)	May 19, 2011 & May 20, 2011
8. Background Study and proposed by-law available to public	May 20, 2011
9. Stakeholders Committee Meeting No. 3 – Water, Wastewater & Stormwater DC	May 27, 2011
10. Public meeting of Council	June 9, 2011
11. Deadline for comments and submissions from the public	June 9, 2011
12. Council considers adoption of Background Study and passage of new by-law and amendment of current by-law (for stormwater only)	June 15, 2011
13. Effective Date of DC By-law passage	July 6, 2011
14. Newspaper notice given of by-law passage	By 20 days after passage
15. Last day for by-law appeal	40 days after passage
16. City makes available pamphlet (where by-law not appealed)	By 60 days after inforce date

2. CURRENT CITY OF HAMILTON POLICY

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2.1 Schedule of Charges

On June 24, 2009, the City of Hamilton passed By-law 09-143 under the *Development Charges Act, 1997*. The by-law came into force on July 6, 2009 and will expire on July 6, 2011. Subsequently the by-law was amended by by-law 09-228 which was passed and came into force on November 11, 2009. By-laws 09-143 and 09-228 impose development charges on residential and non-residential uses on a City-wide basis for roads, transit, airport, fire, police, outdoor recreation, indoor recreation, library, administration, homes for the aged, social housing, health services, social and child care services and ambulance services, as well as special area charges for Binbrook and Dundas/Waterdown areas. Also included in those by-laws are urban area charges for storm water drainage and control services.

On June 24, 2009, the City of Hamilton also passed By-law 09-144 under the *Development Charges Act, 1997*. The by-law came into force on July 6, 2009 and will expire on July 6, 2014. Subsequently the by-law was amended by by-law 09-229 which was passed and came into force on November 11, 2009. By-laws 09-144 and 09-229 impose development charges on residential and non-residential uses for water and wastewater water services.

Further, The City passed By-law No. 06-174 specific to GO Transit. That by-law came into force on July 6, 2006 and will expire July 6, 2011.

This report recommends that by-law 09-143 (as amended by by-law 09-228) be amended to remove storm water drainage and control services. Further a new by-law is recommended encompassing the recommended water, wastewater, stormwater, and GO Transit services.

Table 2-1 provides the rates currently in effect (as well as a breakdown of the charges by service).

TABLE 2-1
CITY OF HAMILTON
DEVELOPMENT CHARGES
Effective July 6, 2010 - July 5, 2011

Service	Residential					Non-Residential (per ft².)
	Single & Semi Detached	Multiples	Apartments with >= 2 Bedrooms	Apartments with < 2 Bedrooms	Residential Facility Dwelling (per bedroom)	
Service Componet						
Urban Area Charges:						
Water Services	3,723	2,668	2,283	1,526	1,098	2.69
Wastewater Services	9,006	6,456	5,524	3,691	2,657	6.51
Stormwater Drainage and Control Services	3,630	2,602	2,227	1,488	1,070	2.31
Total Urban Area Charges	**16,359**	**11,726**	**10,034**	**6,705**	**4,825**	**11.51**
Municipal Wide Charges:						
Services Related to a Highway	5,950	4,264	3,650	2,440	1,755	6.37
Airport	80	78	68	45	32	0.09
Transit	218	134	116	77	56	0.24
Fire Protection Services	289	207	178	119	85	0.19
Police Services	252	181	155	103	75	0.17
Outdoor Recreation Services	800	574	491	329	236	0.05
Indoor Recreation Services	1,030	739	632	423	304	0.06
Library Services	367	263	225	150	108	0.02
Administration	278	199	171	114	81	0.28
Ambulance	16	11	10	7	5	0.01
Homes for the Aged	4	3	2	2	1	-
Health Services	38	27	24	16	12	-
Social & Child Care Services	46	33	28	19	14	0.01
Social Housing	455	327	280	186	134	-
Total Municipal Wide Charges	**9,823**	**7,040**	**6,030**	**4,030**	**2,898**	**7.49**
GO Transit (City Wide)	225	180	147	89	67	-
Total Urban Area Charges	**26,407**	**18,946**	**16,211**	**10,824**	**7,790**	**19.00**

Services Currently Under Review

Note: Special Area Charges are in addition to the rates presented above

2.2 Services Covered

The following are the services covered under By-law 09-143 (as amended by No. 09-228):

- Services Related to a Highway;
- Airport;
- Transit;
- Fire Protection Services;
- Police Services;
- Outdoor Recreation Services;
- Indoor Recreation Services;
- Library Services;
- Administration;
- Ambulance;
- Homes for the Aged;
- Health Services;
- Social & Child Care Services;
- Social Housing;
- Storm Water Drainage and Control Services;
- Special Area Charges (i.e., Binbrook, Dundas/Waterdown).

The following are the services covered under By-law 09-144 (as amended by No. 09-229):

- Water Services;
- Wastewater Services.

The following service is covered By-law 06-174:

- GO Transit Services.

2.3 Timing of DC Calculation and Payment

Development charges are calculated and payable upon the issuance of a building permit in relation to each dwelling unit, building or structure on land to which a development charge applies.

2.4 Indexing

By-laws 09-143 (as amended by No. 09-228), 09-144 (as amended by No. 09-229) and 06-173 all provide for the annual indexing of charges on July 6th of each year, without amendment to the by-law.

2.5 Redevelopment Credit

A credit shall be allowed, provided that the land was improved by occupied structures (or structures capable of occupancy) within five years prior to the date of payment of development charges for the redevelopment, or the building permit has been issued for the development or redevelopment within 5 years from the date the demolition permit has been issued.

2.6 Exemptions

The following exemptions are provided under By-laws 09-143 (as amended by No. 09-228), 09-144 (as amended by No. 09-229) and 06-173:

a) Statutory Exemptions

No development charge shall be imposed on any building owned by and used for the purposes of:

- the City of Hamilton;
- a Board of Education;

- a local board;
- the enlargement of an existing dwelling unit;
- the creation of up to two additional dwelling units, as prescribed, subject to the restrictions, prescribed in s. 2 of the Regulation; and
- development of one or more enlargements of an existing industrial building, whether attached or separate, up to a maximum of (50%) of its gross floor area before the enlargement.

b) Non-Statutory Exemptions

The following are one hundred percent (100%) exempt:

- a parking garage or structure exclusively devoted to parking, including an outdoor parking lot located at grade;
- an agricultural use;
- a place of worship;
- a covered sports field;
- a temporary building or structure;
- a development by a university, other post-secondary school offering a degree or diploma recognized by the Province of Ontario or a not-for-profit private elementary or secondary school operated in compliance with Section 16 of the *Education Act*, R.S.O. 1990, c.E.2, as amended, where the development is used for the academic or teaching purposes of the university or school; except for the Transit Component;
- affordable housing projects that provides housing and incidental facilities primarily for persons of low and moderate income; and
- development within the boundaries of the Downtown Community Improvement Plan (CIP)3.

c) Partial Exemptions

- the initial 5,000 square feet of gross floor area of an expansion of a non-industrial development, which must be situated on the same site as the existing development and where, subsequent to an unattached expansion, the lot is further subdivided such that the original existing development and the unattached expansion thereof are no longer situated on the same lot;
- for any non-industrial development other than an expansion, 50% of the applicable development charge on the first 5,000 square feet, 75% of the applicable development charge on the next 5,000 – 10,000 square feet and

100% of the applicable development charge on the amount of development exceeding 10,000 square feet;

- development of a brownfield property that has been approved by the City for an ERASE Redevelopment Grant, or any successor thereof. The amount of the exemption is equivalent to the cost of environmental remediation on, in or under the property as approved by the City under the ERASE Redevelopment Grant program and required to be paid by the owner, up to but not exceeding the amount of the development charges otherwise payable;
- development of a public hospital, is exempt from 50% of the development charges; and
- development of student residences by McMaster University, is exempt from 50% of the development charges.

d) Other Non-statutory Exemptions/Reductions

- City's per square foot charge for industrial development has been discounted from the full rate of $19.00 per sq. ft. to $6.65 per sq. ft.;
- non-Industrial (commercial/Institutional) charge has been discounted from the full rate of $19.00 to:
    - 1st 5,000 sq. ft.: $9.51 per sq. ft.
    - 2nd 5,000 sq. ft.: $14.24 per sq. ft.
    - 10,000+ sq. ft.: $19.00 per sq. ft.
- for expansions of Non-Industrial developments already in existence as of July 6, 2009 the following rates apply:
    - July 6, 2010 to July 5, 2011
        - 1st 5,000 sq. ft.: exempt
        - 5,000+ sq. ft.: $19.00 per sq. ft.

2.7 Credits

The following credits are provided under following exemptions are provided under By-laws 09-143 (as amended by No. 09-228), 09-144 (as amended by No. 09-229) and 06-174:

- Redevelopments – Demolitions - A credit is allowed for demolitions where the demolition permit was issued after the effective date of the by-law, provided that a building permit has been issued for the redevelopment within 5 years from the date that the demolition permit was issued. The dollar value of the credit is based on the rate in effect at the time of redevelopment and on the exemption status of the demolished/redeveloped building at the time of redevelopment.

- Redevelopments – Conversions – non-residential to residential - where an existing non-residential building or structure is converted in whole or in part to a residential use, the residential development charge payable for the residential units created is reduced by an amount equal to the non-residential rate per square foot established under the by-law, applied against the gross floor area so converted to residential use.

- Redevelopments – Conversions – residential to non-residential - where an existing residential building is converted in whole or in part to non-residential uses, the non-residential development charge payable for the gross floor area so converted shall be reduced by an amount equal to the residential development charge established under the by-law, as applicable, applied for the type of residential unit(s) so converted. If a unit is only partially converted the reduction shall be in proportion to the extent of the conversion;

- Redevelopments – Conversions – mixed use - development charges are payable for the conversion of uses in a mixed use building or structure are determined as with the other conversions noted above.

- Stormwater – where a permanent/centralized stormwater management facility in a particular subdivision has been provided at the cost of the developer as a condition of approval of a plan of subdivision, the facility shall be considered a credit for services-in-lieu and accordingly, DC's on any of the unbuilt lots within the subject subdivision are reduced by the extent of the stormwater management facility sub-component which is 65% of the total stormwater drainage and control services.

3. ANTICIPATED DEVELOPMENT IN THE CITY OF HAMILTON

3. ANTICIPATED DEVELOPMENT IN THE CITY OF HAMILTON

3.1 Requirements of the Act

Chapter 4 provides the methodology for calculating a development charge as per the *Development Charges Act, 1997*. Figure 4-1 presents this methodology graphically. It is noted in the first box of the schematic that in order to determine the development charge that may be imposed, it is a requirement of Section 3.5 (1) of the *Development Charges Act* that "the anticipated amount, type and location of development, for which development charges can be imposed, must be estimated".

The growth forecast contained in this Chapter (with supplemental tables in Appendix A) provides the anticipated development which the City of Hamilton will be required to provide water, wastewater, storm water and GO Transit services to buildout (i.e. year 2031).

3.2 Basis of Population, Household and Non-Residential Gross Floor Area Forecast

The growth forecast is based on work provided by the City of Hamilton Planning Department. The Planning Department's work builds on the Growth Related Integrated Development Strategy (GRIDS), May 2006 and meeting the Province's Places to Grow[1] population and employment targets on Schedule 3. The DC population and employment growth forecast also builds on the 2009 DC Background Study adjusted for recent residential and non-residential construction activity. Lastly, the employment forecast provided herein incorporates the results of the City of Hamilton Airport Employment Growth District Phase 2 Fiscal/Economic Impact Analysis and Marketing Strategy, September 15, 2010.

3.3 Summary of Growth Forecast

The discussion provided herein, summarizes the anticipated growth for the City and describes the basis for the forecast. The result of the growth forecast analysis is summarized in Table 3-1 and Schedule 1. As identified in Table 3-1 and Schedule 1, the population is anticipated to reach 660,000 (including census population undercount)[2] by 2031, resulting in an increase of 124,700 persons over the forecast period.

[1] The Growth Plan for the Greater Golden Horseshoe, 2006.
[2] Population undercount estimated at 2.63%.

TABLE 3-1
CITY OF HAMILTON
RESIDENTIAL GROWTH FORECAST SUMMARY

Year	Population (Excluding Census Undercount)	Population (Including Census Undercount)[1]	Housing Units					
			Singles & Semi-Detached	Multiple Dwellings[2]	Apartments[3]	Other	Total Households	Person Per Unit (PPU)
Mid 2006	504,559	517,815	118,410	25,095	50,155	795	194,455	2.59
Mid 2011	521,348	535,045	124,257	28,240	51,118	795	204,410	2.55
Mid 2031	642,862	659,751	148,481	45,062	81,859	795	276,197	2.33
Mid 2006 - Mid 2011	**16,789**	**17,230**	**5,847**	**3,145**	**963**	**0**	**9,955**	
Mid 2011 - Mid 2031	**121,514**	**124,706**	**24,224**	**16,822**	**30,741**	**0**	**71,787**	

Source: Watson & Associates Economists Ltd., March, 2011.

1. Census Undercount estimated at approximately 2.63% (provided by the City of Hamilton). Note: Population figures have been rounded.

2. Includes townhomes and apartments in duplexes.

3. Includes bachelor, 1 bedroom and 2 bedroom+ apartments.

1. Unit Mix (Appendix A – Schedule 1)

- The forecast housing unit mix for the City was derived from the 2009 DC Study.
- The housing unit growth forecast to 2031 results in a unit mix of 34% low density (single family and semi-detached), 23% medium density (multiples except apartments) and 43% high density (apartments).

2. Planning Period

- The planning period for water, wastewater, storm water and GO Transit services utilize the buildout planning period to the year 2031.

3. Population in New Units (Appendix A - Schedules 2, 3 and 4)

- The number of housing units to be constructed in Hamilton during long term period is presented on *Schedule 1* (average of approximately 3,589 units per annum).

- Population in new units are derived from *Schedules 2, 3, and 4*. Over the 2011 to 2031 period, the City's population in new units is forecast to increase by approximately 176,160 persons.

- Schedule 6 summarizes the twenty year average PPU by housing units. The PPU is based on a 2006 custom Census data and has been adjusted to meet the Planning Department's forecast. Generally, it is observed that the new housing units, housing occupancy levels tend to increase in the shorter term (i.e. 1-10 years) as new home buyers form families, followed by a decline over the long-term (i.e. 10-30 years) as children age and leave home. This is then followed by a period of gradual stabilization for housing units 30+ years of age. The results of this pattern are that new housing units typically have a higher PPU average in comparison to older units (i.e. 20+ years). The calculated new unit PPU for the City is:
    - Low-density: 3.39
    - Medium-density: 2.43
    - High-density: 1.73

4. Existing Units and Population Change (Appendix A - Schedules 2, 3 and 4)

- Existing households for mid 2011 are based on an estimate by Watson & Associates based on recent residential development activity.

- The decline in average occupancy levels for existing housing units are calculated in Schedules 2, 3 and 4, by aging the existing population over the forecast period. Over the 2011 to 2031 forecast period, the City's population in existing households is forecast to decline by approximately 54,650 persons.

5. Employment (Appendix A, Schedule 8)

- 2006 employment data (place of work) for the City is summarized below:
    - 2,050 primary (1.0%);
    - 13,580 work at home (6.9%);
    - 55,950 industrial (28.4%);
    - 70,305 population related or commercial (35.7%); and
    - 55,300 institutional (28.0%).

- This provides a total employment figure of 197,185 based on the 2006 Census.

- Based on recent non-residential development activity (i.e. non-residential building permits) the City's 2011 employment base is estimated at approximately 234,700.

- Total employment for the City is anticipated to reach 300,000 (including NFPOW) by 2031, which represents an increase of approximately 65,300.

6. Non-Residential Sq. Ft. Estimates (Gross Floor Area (GFA), Appendix A, Schedule 8)

- Square footage estimates were calculated in Schedule 8 based on the following employee density assumptions; 1,000 sq.ft per employee for industrial, 400 sq.ft per employee for commercial and 700 sq.ft. per employee for institutional employment.

- The incremental Gross Floor Area (GFA) increase for the municipality is approximately 39,621,300.sq. ft. by 2031. In terms of the projection of GFA by sector, industrial construction is expected to comprise approximately 44% of total non-residential development over the next 20 years, while commercial and institutional comprise the remaining 24% and 32% respectively.

4. THE APPROACH TO CALCULATION OF THE CHARGE

4. THE APPROACH TO CALCULATION OF THE CHARGE

4.1 Introduction

This chapter addresses the requirements of s.s.5 (1) of the DCA, 1997 with respect to the establishment of the need for service which underpins the development charge calculation. These requirements are illustrated schematically in Figure 4-1.

4.2 Services Potentially Involved

Table 4-1 lists the full range of municipal service categories which are provided within the City.

A number of these services are defined in s.s.2 (4) of the DCA, 1997 as being ineligible for inclusion in development charges. These are shown as "ineligible" on Table 4-1. In addition, two ineligible costs defined in s.s.5 (3) of the DCA are "computer equipment" and "rolling stock with an estimated useful life of (less than) seven years..." In addition, local roads are covered separately under subdivision agreements and related means (as are other local services). Services which are potentially eligible for inclusion in the City development charge are indicated with a "Yes."

4.3 Increase in the Need for Service

The development charge calculation commences with an estimate of "the increase in the need for service attributable to the anticipated development," for each service to be covered by the by-law. There must be some form of link or attribution between the anticipated development and the estimated increase in the need for service. While the need could conceivably be expressed generally in terms of units of capacity, s.s.5(1)3, which requires that Municipal Council indicate that it intends to ensure that such an increase in need will be met, suggests that a project-specific expression of need would be most appropriate.

4.4 Local Service Policy

Some of the need for services generated by additional development consists of local services related to a plan of subdivision. As such, they will be required as a condition of subdivision agreements or consent conditions. Appendix C outlines the proposed local service policy for the City of Hamilton.

Figure 4-1
The Process of Calculating A Development Charge Under the DCA,1997

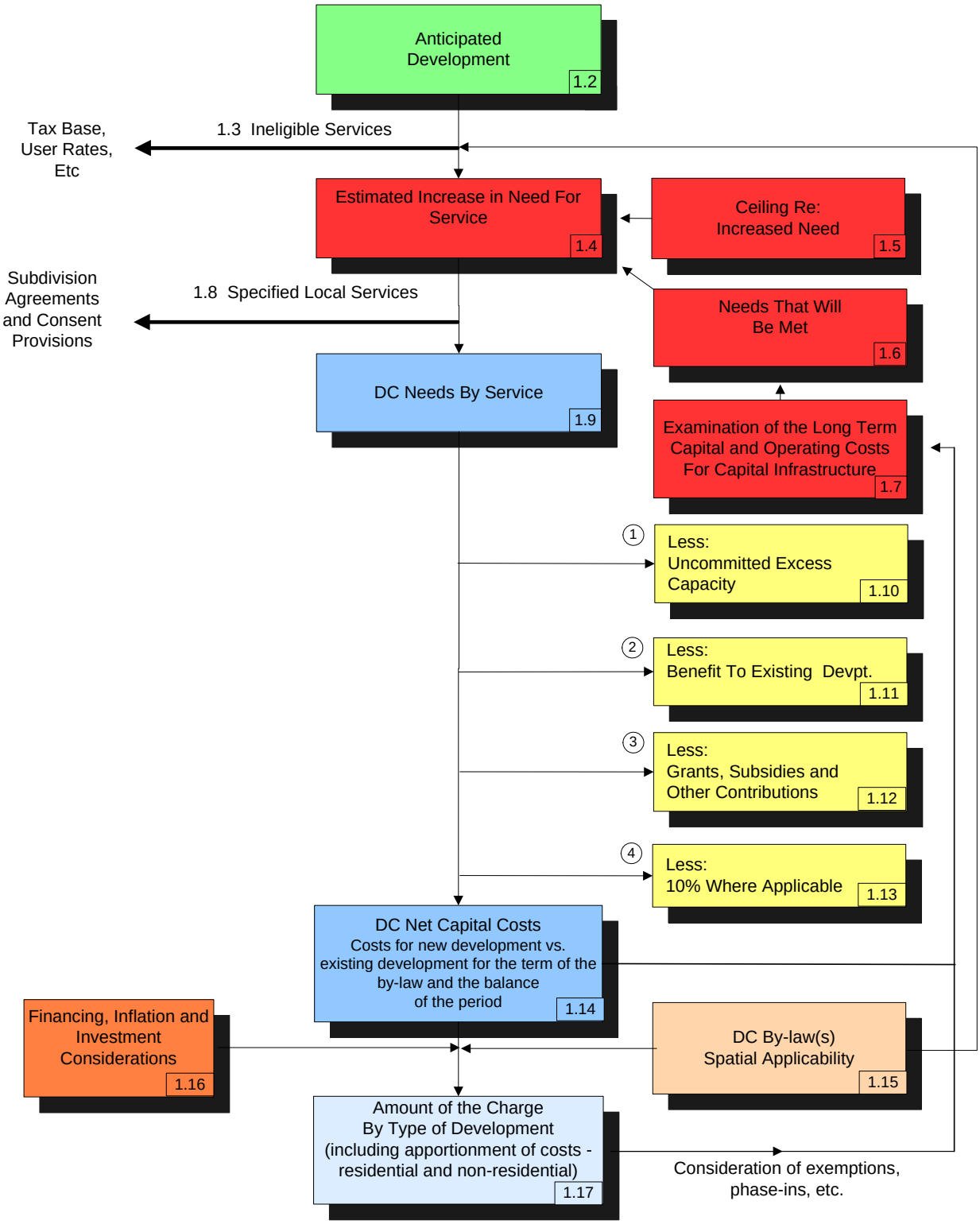


TABLE 4-1
CATEGORIES OF MUNICIPAL SERVICES
TO BE ADDRESSED AS PART OF THE CALCULATION

CATEGORIES OF MUNICIPAL SERVICES	ELIGIBILITY FOR INCLUSION IN THE DC CALCULATION (see legend below)	SERVICE COMPONENTS	MAXIMUM POTENTIAL DC RECOVERY %
Yes -Municipality provides the Service – service has been included in the DC No - Municipality provides the Service – service has not been included in the DC n/a – Municipality does not provide the service Ineligible – Service is ineligible for inclusion in the DC calculation			
1. Services Related to a Highway	Yes	1.1 Arterial roads	100
	Yes	1.2 Collector roads	100
	Yes	1.3 Bridges, Culverts and Roundabouts	100
	No	1.4 Local municipal roads	0
	Yes	1.5 Traffic signals	100
	Yes	1.6 Sidewalks and streetlights	100
2. Other Transportation Services	Yes	2.1 Transit vehicles & facilities	90
	Yes	2.2 Other transit infrastructure	90
	Yes	2.3 Municipal parking spaces - indoor	90
	Yes	2.4 Municipal parking spaces - outdoor	90
	Yes	2.5 Works Yards	100
	Yes	2.6 Rolling stock[1]	100
	n/a	2.7 Ferries	90
	Yes	2.8 Airport	90
	Yes	2.9 GO Transit	90
3. Stormwater Drainage and Control Services	Yes	3.1 Main channels and drainage trunks	100
	Yes	3.2 Channel connections	100
	Yes	3.3 Retention/detention ponds	100
4. Fire Protection Services	Yes	4.1 Fire stations	100
	Yes	4.2 Fire pumpers, aerials and rescue vehicles	100
	Yes	4.3 Small equipment and gear	100
5. Outdoor Recreation Services (i.e. Parks and Open Space)	Ineligible	5.1 Acquisition of land for parks, woodlots and ESAs	0
	Yes	5.2 Development of area municipal parks	90
	Yes	5.3 Development of district parks	90
	Yes	5.4 Development of City-wide parks	90
	Yes	5.5 Development of special purpose parks	90
	Yes	5.6 Parks rolling stock[1] and yards	90
6. Indoor Recreation Services	Yes	6.1 Arenas, indoor pools, fitness facilities, community centres, etc. (including land)	90
	Yes	6.2 Recreation vehicles and equipment[1]	90
7. Library Services	Yes	7.1 Public library space (incl. furniture and equipment)	90
	Yes	7.2 Library Vehicles[1]	90
	Yes	7.3 Library materials	90
8. Electrical Power Services	Ineligible	8.1 Electrical substations	0
	Ineligible	8.2 Electrical distribution system	0
	Ineligible	8.3 Electrical system rolling stock[1]	0

[1] with 7+ year life time

*same percentage as service component to which it pertains
computer equipment excluded throughout

CATEGORIES OF MUNICIPAL SERVICES	ELIGIBILITY FOR INCLUSION IN THE DC CALCULATION (see legend below)	SERVICE COMPONENTS	MAXIMUM POTENTIAL DC RECOVERY %
Yes -Municipality provides the Service – service has been included in the DC No - Municipality provides the Service – service has not been included in the DC n/a – Municipality does not provide the service Ineligible – Service is ineligible for inclusion in the DC calculation			
9. Provision of Cultural, Entertainment and Tourism Facilities and Convention Centres	Ineligible Ineligible	9.1 Cultural space (e.g. art galleries, museums and theatres) 9.2 Tourism facilities and convention centres	0 0
10. Wastewater Services	Yes Yes n/a Yes	10.1 Treatment plants 10.2 Sewage trunks 10.3 Local systems 10.4 Vehicles and equipment	100 100 0 100
11. Water Supply Services	Yes Yes n/a Yes	11.1 Treatment plants 11.2 Distribution systems 11.3 Local systems 11.4 Vehicles and equipment	100 100 0
12. Waste Management Services	Ineligible Ineligible Ineligible	12.1 Collection, transfer vehicles and equipment 12.2 Landfills and other disposal facilities 12.3 Other waste diversion facilities	0 0 0
13. Police Services	Yes Yes Yes	13.1 Police detachments 13.2 Police rolling stock[1] 13.3 Small equipment and gear	100 100 100
14. Homes for the Aged	Yes	14.1 Homes for the aged space	90
15. Child Care	Yes	15.1 Child care space	90
16. Health	Yes Yes	16.1 Health department space 16.2 Health department vehicles[1]	90 90
17. Social Housing	Yes	17.1 Social Housing space	90
18. Provincial Offences Act (POA)	Yes	18.1 POA space	90
19. Social Services	Yes	19.1 Social service space	90
20. Ambulance	Yes Yes	20.1 Ambulance station space 20.2 Vehicles[1]	90 90
21. Hospital Provision	Ineligible	21.1 Hospital capital contributions	
22. Provision of Headquarters for the General Administration of Municipalities and Area Municipal Boards	Ineligible Ineligible Ineligible	22.1 Office space 22.2 Office furniture 22.3 Computer equipment	0 0 0
23. Other Services	Yes Yes	23.1 Studies in connection with acquiring buildings, rolling stock, materials and equipment, and improving land[2] and facilities, including the DC background study cost 23.2 Interest on money borrowed to pay for growth-related capital	0-100 0-100

[1] with 7+ year life time

*same percentage as service component to which it pertains
computer equipment excluded throughout

4.5 Capital Forecast

Paragraph 7 of s.s.5(1) of the DCA requires that "the capital costs necessary to provide the increased services must be estimated." The Act goes on to require two potential cost reductions and the Regulation sets out the way in which such costs are to be presented. These requirements are outlined below.

These estimates involve capital costing of the increased services discussed above. This entails costing actual projects or the provision of service units, depending on how each service has been addressed.

The capital costs include:

a) costs to acquire land or an interest therein (including a leasehold interest);
b) costs to improve land;
c) costs to acquire, lease, construct or improve buildings and structures;
d) costs to acquire, lease or improve facilities including rolling stock (with useful life of 7 or more years), furniture and equipment (other than computer equipment), materials acquired for library circulation, reference or information purposes;
e) interest on money borrowed to pay for the above-referenced costs;
f) costs to undertake studies in connection with the above-referenced matters; and
g) costs of the development charge background study.

In order for an increase in need for service to be included in the DC calculation, Municipal Council must indicate "...that it intends to ensure that such an increase in need will be met" (s.s.5 (1)3). This can be done if the increase in service forms part of a Council-approved Official Plan, capital forecast or similar expression of the intention of Council (O.Reg. 82/98 s.3). The capital program contained herein reflects the City's approved and proposed capital budgets and master servicing/ needs studies.

4.6 Treatment of Credits

Section 8 para. 5 of O.Reg. 82/98 indicates that a development charge background study must set out, "The estimated value of credits that are being carried forward relating to the service." s.s.17 para. 4 of the same Regulation indicates that, "...The value of the credit cannot be recovered from future development charges," if the credit pertains to an ineligible service. This implies that a credit for eligible services can be recovered from future development charges. As a result, this provision should be made in the calculation, in order to avoid a funding shortfall with respect to future service needs. Outstanding DC credit obligations that would affect the development charge calculation have been included in the calculations.

4.7 Eligible Debt and Committed Excess Capacity

Section 66 of the DCA, 1997 states that for the purposes of developing a development charge by-law, a debt incurred with respect to an eligible service may be included as a capital cost, subject to any limitations or reductions in the Act. Similarly, s.18 of O.Reg. 82/98 indicates that debt with respect to an ineligible service may be included as a capital cost, subject to several restrictions.

In order for such costs to be eligible, two conditions must apply. First, they must have funded excess capacity which is able to meet service needs attributable to the anticipated development. Second, the excess capacity must be "committed," that is, either before or at the time it was created, City Council must have expressed a clear intention that it would be paid for by development charges or other similar charges. For example, this may have been done as part of previous development charge processes. It is noted that projects which have been debentured to date and to which the principal and interest costs need to be recovered are included within the capital detail sheets. Further, future financing costs have been estimated and included based on the City's current forecast.

4.8 Existing Reserve Funds

Section 35 of the DCA states that:

> "The money in a reserve fund established for a service may be spent only for capital costs determined under paragraphs 2 to 8 of subsection 5(1)."

There is no explicit requirement under the DCA calculation method set out in s.s.5(1) to net the outstanding reserve fund balance as part of making the DC calculation; however, s.35 does restrict the way in which the funds are used in future.

For services which are subject to a per capita-based, service level "cap," the reserve fund balance should be applied against the development-related costs for which the charge was imposed, once the project is constructed (i.e. the needs of recent growth). This cost component is distinct from the development-related costs for the next 10 year period, which underlie the DC calculation herein.

The alternative would involve the municipality spending all reserve fund monies prior to renewing each by-law, which would not be a sound basis for capital budgeting. Thus, the City will use these reserve funds for the City's cost share of applicable development-related projects, which are required but have not yet been undertaken, as a way of directing the funds to the benefit of the development which contributed them (rather than to future development, which will generate the need for additional facilities directly proportionate to future growth).

The City's Development Charge Reserve Fund Balance by service at December 31, 2010 is shown below:

Service	Totals
GO Transit	$0.00
Stormwater Drainage and Control Services	$5,064,918.31
Wastewater Services:	
- Linear	$20,486,958.25
- WWTP	$21,940,112.53
Water Services	$30,009,766.04
Total	**$77,501,755.14**

Note that the year end balances as presented above have been deducted from the amount of funding required from DCs in the calculations contained within this background report.

4.9 Deductions

The DCA, 1997 potentially requires that five deductions be made to the increase in the need for service. These relate to:

- The level of service ceiling;
- Uncommitted excess capacity;
- Benefit to existing development;
- Anticipated grants, subsidies and other contributions; and
- 10% reduction for certain services.

The requirements behind each of these reductions are addressed as follows:

4.9.1 Reduction Required by Level of Service Ceiling

This is designed to ensure that the increase in need included in 4.2 does "…not include an increase that would result in the level of service (for the additional development increment) exceeding the average level of the service provided in the municipality over the 10-year period immediately preceding the preparation of the background study…" O.Reg 82.98 (s.4) goes further to indicate that "…both the quantity and quality of a service shall be taken into account in determining the level of service and the average level of service."

In many cases, this can be done by establishing a quantity measure in terms of units as floor area, land area or road length per capita and a quality measure, in terms of the average cost of providing such units based on replacement costs, engineering standards or recognized performance measurement systems, depending on circumstances. When the quantity and

quality factor are multiplied together, they produce a measure of the level of service, which meets the requirements of the Act, i.e. cost per unit.

The average service level calculation sheet for the GO Transit service component in the DC calculation is set out in Appendix B.

4.9.2 Reduction for Uncommitted Excess Capacity

Paragraph 5 of s.s.5(1) requires a deduction from the increase in the need for service attributable to the anticipated development that can be met using the City's "excess capacity", other than excess capacity which is "committed" (discussed above in 4.6).

"Excess capacity" is undefined, but in this case must be able to meet some or all of the increase in need for service, in order to potentially represent a deduction. The deduction of uncommitted excess capacity from the future increase in the need for service, would normally occur as part of the conceptual planning and feasibility work associated with justifying and sizing new facilities, e.g. if a road widening to accommodate increase traffic is not required because sufficient excess capacity is already available, then widening would not be included as an increase in need, in the first instance.

4.9.3 Reduction for Benefit to Existing Development

This step involves a further reduction to the need, by the extent to which such an increase in service would benefit existing development. The level of services cap in 4.4 is related, but is not the identical requirement. Sanitary, storm and water trunks are highly localized to growth areas and can be more readily allocated in this regard than other services such as roads which do not have a fixed service area.

Where existing development has an adequate service level, which will not be tangibly increased by an increase in service, no benefit would appear to be involved. For example, where expanding existing library facilities simply replicates what existing residents are receiving, they receive very limited (or no) benefit as a result. On the other hand, where a clear existing service problem is to be remedied, a deduction should be made, accordingly.

In the case of services such as recreation facilities, community parks, libraries, etc., the service is typically provided on a municipal-wide system basis. For example, facilities of the same type may provide different services (i.e. leisure pool vs. competitive pool), different programs (i.e. hockey vs. figure skating) and different time availability for the same service (i.e. leisure skating available on Wednesday in one arena and Thursday in another). As a result, residents will travel to different facilities to access the services they want at the times they wish to use them, and facility location generally does not correlate directly with residence location. Even where it

does, displacing users from an existing facility to a new facility frees up capacity for use by others and generally results in only a very limited benefit to existing development. Further, where an increase in demand is not met for a number of years, a negative service impact to existing development is involved for a portion of the planning period.

4.9.4 Reduction for Anticipated Grants, Subsidies and Other Contributions

This step involves reducing the capital costs necessary to provide the increased services by capital grants, subsidies and other contributions made or anticipated by Council and in accordance with various rules such as the attribution between the share related to new vs. existing development. (i.e. some grants and contributions may not specifically be applicable to growth, such as the COMRIF Grant program or where Council targets fundraising as a measure to offset impacts on taxes.) O.Reg 82.98 .s.6.

4.9.5 The 10% Reduction

Paragraph 8 of s.s.(1) of the DCA requires that, "the capital costs must be reduced by 10 percent." This paragraph does not apply to water services, wastewater services, stormwater drainage and control services, services related to a highway, police and fire protection services. The primary services that the 10% reduction does apply to include services such as transit, outdoor recreation, indoor recreation, libraries, administration (studies), homes for the aged, social housing, health, social/childcare, and ambulance.

The 10% is to be netted from the capital costs necessary to provide the increased services, once the other deductions have been made, as per the infrastructure costs sheets in Chapter 5.

5. DEVELOPMENT CHARGE ELIGIBLE COST ANALYSIS BY SERVICE

5. DEVELOPMENT CHARGE ELIGIBLE COST ANALYSIS BY SERVICE

5.1 Introduction

This chapter outlines the basis for calculating development charge eligible costs for the development charges to be applied on a uniform basis. In each case, the required calculation process set out in s.5(1) paragraphs 2 to 8 in the DCA, 1997, and described in Chapter 4, was followed in determining DC eligible costs.

The nature of the capital projects and timing identified in the Chapter reflects Council's current intention. However, over time, municipal projects and Council priorities change and accordingly, Council's intentions may alter, and different capital projects (and timing) may be required to meet the need for services required by new growth.

5.2 Service Levels and 10-Year Capital Costs for DC Calculation

This section evaluates the development-related capital requirements for GO Transit services over a ten-year planning period. The service component is evaluated on two format sheets: the average historical ten-year level of service calculation, which "caps" the DC amounts; and the infrastructure cost calculation, which determines the potential DC recoverable cost.

5.2.1 GO Transit

The work contained within this report is an extension of the work undertaken in the June, 2006 City of Hamilton Development Charge Background Study for the GO Transit Service. A similar approach has been undertaken however information released by the Province is less detailed than in the past. Based upon discussions with the Provincial staff, the level of capital spending is anticipated to be in the same order of magnitude, and has been inflated to 2011 dollars. Appendix G outlines the service standard and capital program and extends the discussion on the GO Transit service as it pertains to the proposed Development Charges.

The GO Transit Service is attributable entirely to residential development. The total growth related portion of capital works attributable to Hamilton is $4,298,096; this amount has been included in the DC calculation.

INFRASTRUCTURE COSTS COVERED IN THE DC CALCULATION

City of Hamilton
Service: GO Transit

Prj.No	Increased Service Needs Attributable to Anticipated Development 2011-2020	Timing (year)	Gross Capital Cost Estimate (2011$)	Projects which do not require funding from GTA/H	Net Capital Cost	Deduction for Benefit Beyond GTA/H (2%)	Net Capital Cost	Less: Grants, Subsidies and Other Contributions Attributable to New Development	Subtotal	Less: Other Municipalities Share of Costs	Total Hamilton Share (2.8%)	Less: Existing Benefit	Subtotal	Less: Other (e.g. 10% Statutory Deduction)	Potential DC Recoverable Cost: Total	Residential Share 100%	Non-Residential Share 0%
1	Total Growth Capital Plan	2011-2020	1,929,244,000	256,410,887	1,672,833,113	33,456,662	1,639,376,450	1,092,917,634	546,458,817	531,157,970	15,300,847	10,525,185	4,775,662	477,566	4,298,096	4,298,096	0
	Total		**1,929,244,000**	**256,410,887**	**1,672,833,113**	**33,456,662**	**1,639,376,450**	**1,092,917,634**	**546,458,817**	**531,157,970**	**15,300,847**	**10,525,185**	**4,775,662**	**477,566**	**4,298,096**	**4,298,096**	**0**

5.3 Service Levels and Twenty One-Year Capital Costs for City DC Calculation

This section evaluates the development-related capital requirements for those services with twenty one year capital costs.

5.3.1 Stormwater Services

AMEC Earth & Environmental (formerly Philips Engineering) undertook an assessment of the needs for stormwater management within the serviced areas of the City. Appendix F provides the detailed assessment and allocation of works between existing benefit and growth. In total, AMEC has identified $474.58 million in works required. Of this amount, $20.96 million has been identified as benefiting existing development within the City, $218.03 million identified as a direct developer contribution, leaving a net amount of $235.59 attributable to growth over the 21 year forecast period.

In addition to the works identified by AMEC, adjustments have been made to recognize outstanding debt obligations, the balance in the existing reserve fund, credits and agreement obligations (including best efforts clauses against works preformed by developers prior to this DC calculation), provisions for the residential portion of non-residential ponds/non-residential portion of residential ponds and growth related stormwater studies required. These total $35.83 million of which $29.54 million is attributable to growth over the forecast period. Therefore, the total to be included in the DC calculation for all of the above is $265,128,502.

The following is a summary of the gross and net DC recoverable costs based on the AMEC assessment and all other adjustments:

Item	Gross Estimated Cost	Less Non-DC Eligible Growth Cost	DC Eligible Growth Cost
Stormwater Works Identified by AMEC (Appendix F)			
Category A Watercourses	14,295,630	2,345,430	11,950,199
Category B Off-Site Erosion	15,831,450	10,092,999	5,738,451
Category C SWM	241,230,340	114,396,923	126,833,417
Category D Sewer Oversizing	7,554,544	-	7,554,544
Category E Culverts/Bridges	12,525,000	-	12,525,000
GRIDS SWM	173,613,284	112,154,266	61,459,018
GRIDS Watercourses	9,532,974	-	9,532,974
Sub-Total Works Identified by AMEC	**474,583,221**	**238,989,618**	**235,593,603**
Other Works, Credits & Adjustments:			
Provision for Residential Portion of Non-Residential Ponds	580,612	-	580,612
Provision for Non-Residential Portion of Residential Ponds	(843,725)	-	(843,725)
Stormwater Studies	8,586,000	1,230,000	7,356,000
Provision for Best Efforts Agreeemnts	952,693	-	952,693
Provision for Stormwater Credits	8,526,884	-	8,526,884
Existing Growth Related Debt	197,037	-	197,037
New Growth Related Financing (Discounted)	17,830,317	-	17,830,317
Reserve Fund Adjustment	-	5,064,918	(5,064,918)
Sub-Total Other Works, Credits & Adjustments	**35,829,818**	**6,294,918**	**29,534,899**
Total	**510,413,039**	**245,284,536**	**265,128,502**

For Stormwater Facilities (only), a new policy has been recommended which would require the non-residential facilities be installed directly by the non-residential development. This would result in the allocation between residential and non-residential development for stormwater ponds to be 100%/0% as the non-residential ponds will be considered a local service under the City's policy (see Appendix C). For all other stormwater works the allocation between residential and non-residential development is 58%/42% based on the benefiting lands associated with the stormwater management works.

INFRASTRUCTURE COSTS COVERED IN THE DC CALCULATION

City of Hamilton

Service: Stormwater Works & Studies (excluding Facilities)

Prj.No	Increased Service Needs Attributable to Anticipated Development 2011-Urban Build Out	Timing (year)	Gross Capital Cost Estimate	Post Period Benefit	Other Deductions	Net Capital Cost	Less:		Total		
							Benefit to Existing Development	Grants, Subsidies and Other Contributions Attributable to New Development	Total	Residential Share 58%	Non-Residential Share 42%
1	Open Watercourses - Erosion Control and Channel Systems Improvements	2011-2015	392,826	0		392,826	0		392,826	229,018	163,808
2	Open Watercourses - Erosion Control and Channel Systems Improvements	2016-2020	278,600	0		278,600	139,300		139,300	81,212	58,088
3	Open Watercourses - Erosion Control and Channel Systems Improvements	2021-2031	13,624,204	0		13,624,204	2,206,130		11,418,073	6,656,758	4,761,315
4	Off Site Erosion Works	2011-2031	15,831,450	0		15,831,450	10,092,999		5,738,451	3,345,528	2,392,923
5	Oversizing of trunk sewers and culverts	2011-2015	4,399,205	0		4,399,205	0		4,399,205	2,564,745	1,834,460
6	Oversizing of trunk sewers and culverts	2016-2020	3,155,339	0		3,155,339	0		3,155,339	1,839,569	1,315,770
7	Culverts and Bridges not previously identified	2011-2031	12,525,000	0		12,525,000	0		12,525,000	7,302,099	5,222,901
8	GRIDS Related Water courses	2016-2031	9,532,974	0		9,532,974	0		9,532,974	5,557,742	3,975,232
9	Reserve Fund Adjustment		0	0		(5,064,918)	0		(5,064,918)	(2,952,857)	(2,112,061)
	Stormwater Studies:										
10	Upper Davis Creek Subwatershed Study	2011	200,000	0		200,000	0		200,000	116,600	83,400
11	Upper Ottawa Subwatershed Study	2011	100,000	0		100,000	0		100,000	58,300	41,700
12	Stoney Creek Urban Boundary Exapnsion (Storm)	2012	60,000	0		60,000	0		60,000	34,980	25,020
13	Greensville Settlement Servicing Study	2013	33,000	0		33,000	0		33,000	19,239	13,761
14	Stormwater Management Monitoring	2011-2031	460,000	0		460,000	0		460,000	268,181	191,819
15	Specific Area Water Shed Master Plans	2011-2013	600,000	0		600,000	0		600,000	349,801	250,199
16	Specific Area Water Shed Master Plans	2014-2019	1,200,000	0		1,200,000	0		1,200,000	699,602	500,398
17	Ainslie Wood Westdale Stormwater Drainage Master Plan	2018	200,000	0		200,000	0		200,000	116,600	83,400
18	Ainsliewood/Westdale Neighbourhoods Class EA	2011	200,000	0		200,000	0		200,000	116,600	83,400
19	Airport	2011	500,000	0		500,000	0		500,000	291,501	208,499
20	Ancaster Industrial Park Municipal Class EA	2011	200,000	0		200,000	0		200,000	116,600	83,400
21	Binbrook Urban Settlement & Southbrook SWM	2011	200,000	0		200,000	0		200,000	116,600	83,400
22	Cherry Beach EA & Preliminary Design Study	2011	200,000	0		200,000	0		200,000	116,600	83,400
23	Davis Creek Subwatershed Study	2011	200,000	0		200,000	0		200,000	116,600	83,400
24	Delsey Creek Storm Drainage Master Plan	2019	200,000	0		200,000	0		200,000	116,600	83,400
25	Falkirk East Storm Drainage Class EA	2011	200,000	0		200,000	0		200,000	116,600	83,400
26	Garner Neighbourhood Master Drainage Plan	2011	200,000	0		200,000	0		200,000	116,600	83,400
27	Meadowlands Neighbourhood 3, 4, and 5. Class EA Master Plan	2011	200,000	0		200,000	0		200,000	116,600	83,400
28	North Waterdown OPA 28 Master Drainage Plan	2011	200,000	0		200,000	0		200,000	116,600	83,400
29	Stoney Creek Master Drainage Plan Industrial Corridor Area 5, 6 & 7	2011	200,000	0		200,000	0		200,000	116,600	83,400
30	Mewburn & Sheldon Neighbourhodds Master Servicing Plan Class EA	2011	200,000	0		200,000	0		200,000	116,600	83,400
31	Montgomery Creek SWM Class EA	2011	200,000	0		200,000	0		200,000	116,600	83,400
32	Mountain Brow Boulevard Crossing and Central Mountain SWM	2011	200,000	0		200,000	0		200,000	116,600	83,400

INFRASTRUCTURE COSTS COVERED IN THE DC CALCULATION

City of Hamilton

Service: Stormwater Works & Studies (excluding Facilities)

Prj.No	Increased Service Needs Attributable to Anticipated Development 2011-Urban Build Out	Timing (year)	Gross Capital Cost Estimate	Post Period Benefit	Other Deductions	Net Capital Cost	Less:		Total		
							Benefit to Existing Development	Grants, Subsidies and Other Contributions Attributable to New Development	Total	Residential Share 58%	Non-Residential Share 42%
33	Watercourse 5 & 6 Class EA Study	2019	200,000	0		200,000	0		200,000	116,600	83,400
34	Watercourse 7 Creek System Improvements EA	2012	200,000	0		200,000	0		200,000	116,600	83,400
35	Watercourse 10/11 - SCUBE	2020	200,000	0		200,000	0		200,000	116,600	83,400
36	Waterdown	2011	500,000	0		500,000	0		500,000	291,501	208,499
37	Stormwater Master Plan	2011	1,333,000	0		1,333,000	1,230,000		103,000	60,049	42,951
38	Outstanding Debt - Principal	2011-2012	181,441	0		181,441	0		181,441	105,780	75,660
39	Outstanding Debt - Interest (Discounted)	2011-2012	15,596	0		15,596	0		15,596	9,093	6,504
40	New Growth Related Financing (Discounted)		4,138,352	0		4,138,352	0		4,138,352	2,412,667	1,725,685
	Total		**72,660,986**	**0**	**0**	**67,596,068**	**13,668,429**	**0**	**53,927,639**	**31,439,915**	**22,487,723**

INFRASTRUCTURE COSTS COVERED IN THE DC CALCULATION

City of Hamilton
Service: Stormwater Facilities

Prj.No	Increased Service Needs Attributable to Anticipated Development 2011-Urban Build Out	Timing (year)	Gross Capital Cost Estimate	Post Period Benefit	Other Deductions	Net Capital Cost	Less:		Total		
							Benefit to Existing Development	Grants, Subsidies and Other Contributions Attributable to New Development	Total	Residential Share 100%	Non-Residential Share 0%
1	Stormwater Management Quality/Quantity Facilities	2011-2015	43,077,484	0		43,077,484	0	14,899,275	28,178,209	28,178,209	0
2	Stormwater Management Quality/Quantity Facilities	2016-2020	3,176,894	0		3,176,894	0	3,176,894	0	0	0
3	Stormwater Management Quality/Quantity Facilities	2021-2031	194,975,961	0		194,975,961	8,517,452	87,803,301	98,655,208	98,655,208	0
4	Provision for Residential Portion of Non-Residential Ponds	2011-2031	580,612	0		580,612	0		580,612	580,612	0
5	Provision for Non-Residential Portion of Residential Ponds	2011-2031	(843,725)	0		(843,725)	0		(843,725)	(843,725)	0
6	GRIDS Related SWM Projects	2011-2031	173,613,284	0		173,613,284	0	112,154,266	61,459,018	61,459,018	0
7	Provision for Best Efforts Agreeemnts	2011-2031	952,693	0		952,693	0		952,693	952,693	0
8	Provision for Stormwater Credits	2011-2031	8,526,884	0		8,526,884	0		8,526,884	8,526,884	0
9	New Growth Related Financing (Discounted)		13,691,965	0		13,691,965	0		13,691,965	13,691,965	0
	Total		**437,752,052**	**0**	**0**	**437,752,052**	**8,517,452**	**218,033,736**	**211,200,864**	**211,200,864**	**0**

5.3.2 Water and Wastewater Services

Provided in Appendix E is the detailed review of the water and wastewater services undertaken by AECOM. In total, $1.501 billion in capital works have been identified including financing costs, existing debt obligations and an estimate of additional growth related financing costs associated with these works for the forecast period. Adjustments to recognize portions of the works that will benefit existing development within the city, totalling $340.92 million, portions benefiting growth beyond 2031, totalling $688,000 and portions of the works that are the direct responsibility of the development community, totalling $202.92 million, have been made resulting in a net recoverable amount of $893,225,527 to be recovered by development charges over the 21 year forecast period.

The allocation between residential and non-residential development is 69%/31% based on flow requirements (as discussed in Appendix E).

The following is a summary of the gross and net recoverable costs based on the AECOM Engineering assessment and all other adjustments:

Item	Gross Estimated Cost	Less Non-DC Eligible Growth Cost	DC Eligible Growth Cost
Water:			
Ancaster Water Distribution System	15,308,000	3,712,000	11,596,000
Waterdown Water Distribution System	33,101,000	6,572,500	26,528,500
Binbrook Water Distribution System	12,907,000	2,342,000	10,565,000
Mount Hope Water Distribution System	13,728,000	2,174,000	11,554,000
Hamilton Mountain Water Distribution System	26,470,389	7,963,076	18,507,313
Stoney Creek Upper Water Distribution System	106,095,000	11,888,000	94,207,000
Stoney Creek Lower Water Distribution System	11,659,000	866,000	10,793,000
Flamborough (excluding Waterdown) Water Distribution System	3,405,000	592,000	2,813,000
City Wide Water Distribution System	49,365,807	7,395,535	41,970,272
Existing Debt	301,597	-	301,597
New Growth Related Financing (Discounted)	41,084,456	-	41,084,456
Reserve Fund Adjustment	-	30,009,766	(30,009,766)
Total Water	**313,425,250**	**73,514,877**	**239,910,372**
Wastewater:			
Linear:			
Ancaster Sanitary Sewage System	4,322,000	1,097,000	3,225,000
Waterdown Sanitary Sewage System	10,998,000	9,463,000	1,535,000
Binbrook Sanitary Sewage System	8,343,000	498,000	7,845,000
Mount Hope Sanitary Sewage System	33,258,000	4,904,500	28,353,500
Hamilton Mountain Sanitary Sewage System	47,253,983	799,500	46,454,483
Stoney Creek Upper Sanitary Sewage System	124,819,000	7,804,000	117,015,000
Stoney Creek Lower Sanitary Sewage System	21,700,592	1,204,437	20,496,155
City Wide Sanitary System	51,988,241	7,706,875	44,281,366
Existing Debt	1,130,414	-	1,130,414
New Growth Related Financing (Discounted)	68,765,218	-	68,765,218
Reserve Fund Adjustment	-	20,486,958	(20,486,958)
Total Wastewater Linear	**372,578,449**	**53,964,270**	**318,614,178**
WWTP:			
Raw Wastewater Pumping	54,100,000	27,591,000	26,509,000
Primary Treatment	68,742,218	54,749,538	13,992,680
New Secondary/Tertiary Treatment Plant	378,048,060	241,804,511	136,243,549
Secondary/Tertiary Chlorine contact Tank, Outfall and Red Hill Creek Upgrades	36,644,400	18,688,644	17,955,756
Engineering (Projects 1, 4a, 4b, 5, 13)	43,570,793	22,221,104	21,349,689
Biogas Digester	49,500,000	35,045,000	14,455,000
Biosolids Thermal Reduction Disposal Facility	73,000,000	37,230,000	35,770,000
New Electrical and power systems	59,241,780	30,213,308	29,028,472
New Growth Related Financing (Discounted)	61,336,943	-	61,336,943
Reserve Fund Adjustment	-	21,940,113	(21,940,113)
Total Wastewater WWTP	**824,184,194**	**489,483,218**	**334,700,976**
Total Wastewater	**1,196,762,643**	**543,447,488**	**653,315,155**
Total Water & Wastewater	**1,510,187,892**	**616,962,365**	**893,225,527**

INFRASTRUCTURE COSTS COVERED IN THE DC CALCULATION

City of Hamilton

Service: Water Services

Prj.No	Increased Service Needs Attributable to Anticipated Development 2011-Urban Build Out	Timing (year)	Gross Capital Cost Estimate	Post Period Benefit	Other Deductions	Net Capital Cost	Less:		Total		
							Benefit to Existing Development	Grants, Subsidies and Other Contributions Attributable to New Development	Total	Residential Share 69%	Non-Residential Share 31%
1	Ancaster Water Distribution System	2011-2015	14,538,000	0		14,538,000	3,134,000		11,404,000	7,868,760	3,535,240
2	Ancaster Water Distribution System	2016-2031	770,000	0		770,000	578,000		192,000	132,480	59,520
3	Waterdown Water Distribution System	2011-2015	15,415,000	0		15,415,000	851,000	2,327,000	12,237,000	8,443,530	3,793,470
4	Waterdown Water Distribution System	2016-2031	17,686,000	0		17,686,000	3,320,000	74,500	14,291,500	9,861,135	4,430,365
5	Binbrook Water Distribution System	2011-2015	11,414,000	0		11,414,000	0	1,819,000	9,595,000	6,620,550	2,974,450
6	Binbrook Water Distribution System	2016-2031	1,493,000	0		1,493,000	0	523,000	970,000	669,300	300,700
7	Mount Hope Water Distribution System	2011-2015	1,027,000	0		1,027,000	0	169,000	858,000	592,020	265,980
8	Mount Hope Water Distribution System	2016-2031	1,121,000	0		1,121,000	0	208,000	913,000	629,970	283,030
9	Mount Hope Water Distribution System	2021-2031	11,580,000	453,000		11,127,000	0	1,344,000	9,783,000	6,750,270	3,032,730
10	Hamilton Mountain Water Distribution System	2011-2015	7,570,389	0		7,570,389	217,000	992,076	6,361,313	4,389,306	1,972,007
11	Hamilton Mountain Water Distribution System	2016-2031	18,296,000	0		18,296,000	0	6,754,000	11,542,000	7,963,980	3,578,020
12	Hamilton Mountain Water Distribution System	2021-2031	604,000	0		604,000	0	0	604,000	416,760	187,240
13	Stoney Creek Upper Water Distribution System	2011-2015	49,754,000	0		49,754,000	0	1,592,000	48,162,000	33,231,780	14,930,220
14	Stoney Creek Upper Water Distribution System	2016-2031	7,404,000	0		7,404,000	1,596,000	896,000	4,912,000	3,389,280	1,522,720
15	Stoney Creek Upper Water Distribution System	2021-2031	48,937,000	0		48,937,000	0	7,804,000	41,133,000	28,381,770	12,751,230
16	Stoney Creek Lower Water Distribution System	2011-2015	4,309,000	0		4,309,000	0	866,000	3,443,000	2,375,670	1,067,330
17	Stoney Creek Lower Water Distribution System	2016-2031	7,350,000	0		7,350,000	0	0	7,350,000	5,071,500	2,278,500
18	Flamborough (excluding Waterdown) Water Distribution System	2011-2015	3,405,000	0		3,405,000	0	592,000	2,813,000	1,940,970	872,030
19	Flamborough (excluding Waterdown) Water Distribution System	2016-2031	0	0		0	0	0	0	0	0
20	City Wide Water Distribution System	2011-2015	7,395,535	0		7,395,535	2,215,535	0	5,180,000	3,574,200	1,605,800
21	City Wide Water Distribution System	2016-2031	41,970,272	0		41,970,272	5,180,000	0	36,790,272	25,385,288	11,404,984
22	Existing Debt Principal	2011-2023	230,033	0		230,033			230,033	158,723	71,310
23	Existing Debt Interest (Discounted)	2011-2023	71,564	0		71,564			71,564	49,379	22,185
24	Growth Related Financing Costs (Discounted)	2011-UBBO	41,084,456	0		41,084,456			41,084,456	28,348,275	12,736,181
25	Reserve Fund Adjustment					(30,009,766)			(30,009,766)	(20,706,739)	(9,303,027)
	Total		**313,425,250**	**453,000**	**0**	**282,962,483**	**17,091,535**	**25,960,576**	**239,910,372**	**165,538,157**	**74,372,215**

INFRASTRUCTURE COSTS COVERED IN THE DC CALCULATION

City of Hamilton
Service: Wastewater - Sewers (Linear)

Prj.No	Increased Service Needs Attributable to Anticipated Development 2011-Urban Build Out	Timing (year)	Gross Capital Cost Estimate	Post Period Benefit	Other Deductions	Net Capital Cost	Less:		Total		
							Benefit to Existing Development	Grants, Subsidies and Other Contributions Attributable to New Development	Total	Residential Share 69%	Non-Residential Share 31%
1	Ancaster Sanitary Sewage System	2011-2015	3,696,000	235,000		3,461,000	106,000	445,000	2,910,000	2,007,900	902,100
2	Ancaster Sanitary Sewage System	2016-2031	626,000	0		626,000	0	311,000	315,000	217,350	97,650
3	Waterdown Sanitary Sewage System	2011-2015	10,998,000	0		10,998,000	8,654,000	809,000	1,535,000	1,059,150	475,850
4	Waterdown Sanitary Sewage System	2016-2031	0	0		0	0	0	0	0	0
5	Binbrook Sanitary Sewage System	2011-2015	7,812,000	0		7,812,000	0	0	7,812,000	5,390,280	2,421,720
6	Binbrook Sanitary Sewage System	2016-2031	531,000	0		531,000	0	498,000	33,000	22,770	10,230
7	Mount Hope Sanitary Sewage System	2011-2015	7,353,000	0		7,353,000	0	309,000	7,044,000	4,860,360	2,183,640
8	Mount Hope Sanitary Sewage System	2016-2031	25,905,000	0		25,905,000	0	4,595,500	21,309,500	14,703,555	6,605,945
9	Hamilton Mountain Sanitary Sewage System	2011-2015	3,215,983	0		3,215,983	0	475,500	2,740,483	1,890,933	849,550
10	Hamilton Mountain Sanitary Sewage System	2016-2020	1,423,000	0		1,423,000	0	324,000	1,099,000	758,310	340,690
11	Hamilton Mountain Sanitary Sewage System	2021-2031	42,615,000	0		42,615,000	0	0	42,615,000	29,404,350	13,210,650
12	Stoney Creek Upper Sanitary Sewage System	2011-2015	101,172,000	0		101,172,000	0	0	101,172,000	69,808,680	31,363,320
13	Stoney Creek Upper Sanitary Sewage System	2021-2031	23,647,000	0		23,647,000	0	7,804,000	15,843,000	10,931,670	4,911,330
14	Stoney Creek Lower Sanitary Sewage System	2011-2015	20,736,592	0		20,736,592	0	722,437	20,014,155	13,809,767	6,204,388
15	Stoney Creek Lower Sanitary Sewage System	2016-2031	964,000	0		964,000	0	482,000	482,000	332,580	149,420
16	City Wide Sanitary System	2011-2015	36,855,280	0		36,855,280	3,526,875	0	33,328,405	22,996,599	10,331,806
17	City Wide Sanitary System	2016-2031	15,132,961	0		15,132,961	4,180,000	0	10,952,961	7,557,543	3,395,418
18	Existing Debt Principal	2011-2023	862,185	0		862,185			862,185	594,908	267,277
19	Existing Debt Interest (Discounted)	2011-2023	268,229	0		268,229			268,229	185,078	83,151
20	Financing (Linear) (Interest Discounted)	2011-UBBO	68,765,218	0		68,765,218			68,765,218	47,448,001	21,317,218
21	Reserve Fund Adjustment					(20,486,958)			(20,486,958)	(14,136,001)	(6,350,957)
	Total		**372,578,449**	**235,000**	**0**	**351,856,490**	**16,466,875**	**16,775,437**	**318,614,178**	**219,843,783**	**98,770,395**

INFRASTRUCTURE COSTS COVERED IN THE DC CALCULATION

City of Hamilton
Service: Wastewater Facilities

Prj.No	Increased Service Needs Attributable to Anticipated Development 2011-Urban Build Out	Timing (year)	Gross Capital Cost Estimate	Post Period Benefit	Other Deductions	Net Capital Cost	Less:		Total		
							Benefit to Existing Development	Grants, Subsidies and Other Contributions Attributable to New Development	Total	Residential Share 69%	Non-Residential Share 31%
1	Raw Wastewater Pumping	2011-2031	54,100,000	0		54,100,000	27,591,000	0	26,509,000	18,291,210	8,217,790
2a	Primary Treatment (Phase 1 - CEPT) - Engineering Included	2011-2031	16,255,669	0		16,255,669	5,640,918	5,195,046	5,419,705	3,739,597	1,680,109
2b	Primary Treatment (Phase 2 - Tanks) - Including Engineering	2011-2031	52,486,549	0		52,486,549	8,922,892	34,990,683	8,572,974	5,915,352	2,657,622
3	North and South Secondary Treatment Plant Upgrades	2011-2031	0	0		0	0	0	0	0	0
4a	New Secondary/Tertiary Treatment Plant (Phase 1)	2011-2031	302,316,300	0		302,316,300	103,181,313	100,000,000	99,134,987	68,403,141	30,731,846
4b	New Secondary/Tertiary Treatment Plant (Phase 2)	2011-2031	75,731,760	0		75,731,760	38,623,198	0	37,108,562	25,604,908	11,503,654
5	Secondary/Tertiary Chlorine contact Tank, Outfall and Red Hill Creek Upgrades	2011-2031	36,644,400	0		36,644,400	18,688,644	0	17,955,756	12,389,472	5,566,284
6	New WAS Thickening Facility	2011-2031	0	0		0	0	0	0	0	0
7	New Outfall	2011-2031	0	0		0	0	0	0	0	0
8	Engineering (Projects 1, 4a, 4b, 5, 13)	2011-2031	43,570,793	0		43,570,793	22,221,104	0	21,349,689	14,731,285	6,618,403
9	Additional Dewatering Capacity	2011-2031	0	0		0	0	0	0	0	0
10	Refurbishment of Digesters to Increase Capacity	2011-2031	0	0		0	0	0	0	0	0
11	Biogas Digester:	2011-2031	0	0		0	0	0	0	0	0
	Phase 1	2011-2031	42,000,000	0		42,000,000	11,220,000	20,000,000	10,780,000	7,438,200	3,341,800
	Phase 2	2011-2031	7,500,000	0		7,500,000	3,825,000	0	3,675,000	2,535,750	1,139,250
12	Biosolids Thermal Reduction Disposal Facility	2011-2031	73,000,000	0		73,000,000	37,230,000	0	35,770,000	24,681,300	11,088,700
13	New Electrical and power systems	2011-2031	59,241,780	0		59,241,780	30,213,308	0	29,028,472	20,029,646	8,998,826
14	Reserve Fund Adjustment					(21,940,113)			(21,940,113)	(15,138,678)	(6,801,435)
15	Financing	2011-2031	61,336,943	0		61,336,943	0		61,336,943	42,322,491	19,014,452
	Total		**824,184,194**	**0**	**0**	**802,244,082**	**307,357,376**	**160,185,729**	**334,700,976**	**230,943,674**	**103,757,303**

6. DEVELOPMENT CHARGE CALCULATION

6. DEVELOPMENT CHARGE CALCULATION

Table 6-1 calculates the proposed development charge for the water and wastewater services over the twenty one year forecast period and Table 6-2 calculates the proposed development charge for the stormwater services over the twenty one year forecast period. Table 6-3 calculates the proposed uniform development charge to be imposed on anticipated development for Go Transit services over a 10-year planning horizon.

Table 6-4 summarizes the development charges as calculated herein.

The residential calculations are provided by dividing the DC-eligible costs for all residential development (as provided in Chapter 5) by the gross population over each forecast period, thus providing a "cost per capita". The cost per capita is then multiplied by the average occupancy (persons per unit) for low, medium and high density building forms to derive the development charge. (Appendix A provides for the gross population figures for each forecast period along with the average occupancy by unit type.) Similar calculations are provided for non-residential development; however, the DC-eligible cost for each service is divided by the forecast building area (square footage) to provide the non-residential charge on a cost per square foot basis.

A requirement of the *Development Charges Act* is to provide the anticipated capital spending and sources of revenue over the five-year life of the by-law. This summary is provided in Tables 6-7 and 6-8.

TABLE 6-1
CITY OF HAMILTON
DEVELOPMENT CHARGE CALCULATION
Municipal-wide Services
2011-Urban Build Out

SERVICE	2011 $ DC Eligible Cost		2011 $ DC Eligible Cost	
	Residential	Non-Residential	SDU	per ft²
	$	$	$	$
1. Stormwater Drainage and Control Services				
1.1 Channels, drainage and studies	31,439,915	22,487,723	605	0.57
1.2 Residenital Ponds	211,200,864	0	4,064	0.00
	242,640,779	22,487,723	4,669	0.57
2. Wastewater Services				
2.1 Treatment plants	230,943,674	103,757,303	4,444	2.62
2.2 Sewers	219,843,783	98,770,395	4,230	2.49
	450,787,457	202,527,698	8,674	5.11
3. Water Services				
3.1 Distribution systems	165,538,157	74,372,215	3,186	1.88
	165,538,157	74,372,215	3,186	1.88
TOTAL	$858,966,393	$299,387,637	$16,529	7.56
DC ELIGIBLE CAPITAL COST	$858,966,393	$299,387,637		
Build out Gross Population / GFA Growth (ft².)	176,165	39,621,300		
Cost Per Capita / Non-Residential GFA (ft².)	$4,875.92	$7.56		

By Residential Unit Type	p.p.u	
Single and Semi-Detached Dwelling	3.39	$16,529
Apartments - 2 Bedrooms +	2.10	$10,239
Apartments - Bachelor and 1 Bedroom	1.40	$6,826
Other Multiples	2.43	$11,848
Residential Facility Dwelling	1.10	$5,364

TABLE 6-2
CITY OF HAMILTON
DEVELOPMENT CHARGE CALCULATION
Ten Year Forecast
2011-2020

SERVICE	2011 $ DC Eligible Cost		2011 $ DC Eligible Cost	
	Residential	Non-Residential	SDU	per ft²
	$	$	$	$
4. GO Transit				
4.1 Transit vehicles	4,298,096	0	215	0.00
	4,298,096	0	215	0.00
TOTAL	$4,298,096	$0	$215	$0.00
DC ELIGIBLE CAPITAL COST	$4,298,096	$0		
10 Year Gross Population / GFA Growth (ft².)	67,619	18,194,600		
Cost Per Capita / Non-Residential GFA (ft².)	$63.56	$0.00		

By Residential Unit Type	p.p.u	
Single and Semi-Detached Dwelling	3.39	$215
Apartments - 2 Bedrooms +	2.10	$133
Apartments - Bachelor and 1 Bedroom	1.40	$89
Other Multiples	2.43	$154
Residential Facility Dwelling	1.10	$70

TABLE 6-3
CITY OF HAMILTON
DEVELOPMENT CHARGE CALCULATION
TOTAL ALL SERVICES

	2011 $ DC Eligible Cost		2011 $ DC Eligible Cost	
	Residential	Non-Residential	SDU	per ft²
	$	$	$	$
Urban-wide Services Build out	$858,966,393	$299,387,637	$16,529	$7.56
Municipal-wide GO Transit Service (10 Year)	4,298,096	0	215	0.00
TOTAL	863,264,489	299,387,637	16,744	7.56

Table 6-4
CITY OF HAMILTON
GROSS EXPENDITURE AND SOURCES OF REVENUE SUMMARY
FOR COSTS TO BE INCURRED OVER THE LIFE OF THE BY-LAW

Service	Total Gross Cost	SOURCES OF FINANCING			Total Gross Cost Attributable to City of Hamilton	SOURCES OF FINANCING			Post DC Period Benefit	DC RESERVE FUND	
		TAX BASE OR OTHER NON-DC SOURCE				TAX BASE OR OTHER NON-DC SOURCE					
		GO Transit Costs which do not require GTA/H Funding & Benefit beyond the GTA	Other Municipal Funding (GTA Municipalities)	GO Transit Funding - 2/3 Funding from other levels of Government		Benefit to Existing	Other Funding	Legislated Reduction		Residential	Non-Residential
1. Stormwater Drainage and Control Services											
1.1 Channels, drainage and studies	18,179,090	0	0		18,179,090	3,633,095	0	0	0	8,480,343	6,065,653
1.2 Residenital Ponds	84,351,334	0	0		84,351,334	0	41,602,672	0	0	42,748,663	0
2. Wastewater Services											
2.1 Treatment plants	105,643,928	0	0		105,643,928	42,564,800	22,183,536	0	0	28,217,958	12,677,634
2.2 Sewers	191,838,855	0	0		191,838,855	12,286,875	2,760,937	0	235,000	121,823,670	54,732,373
3. Water Services											
3.1 Distribution systems	114,827,924	0	0		114,827,924	6,417,535	8,357,076	0	0	69,036,786	31,016,527
4. GO Transit											
4.1 Transit vehicles	964,622,000	144,933,775	265,578,985	546,458,817	7,650,423	5,262,592	0	238,783	0	2,149,048	0
TOTAL EXPENDITURES & REVENUES	**$1,479,463,131**	**$144,933,775**	**$265,578,985**	**$546,458,817**	**$522,491,555**	**$70,164,897**	**$74,904,221**	**$238,783**	**$235,000**	**$272,456,467**	**$104,492,186**

7. DEVELOPMENT CHARGE POLICY RECOMMENDATIONS AND DEVELOPMENT CHARGE BY-LAW RULES

7. DEVELOPMENT CHARGE POLICY RECOMMENDATIONS AND DEVELOPMENT CHARGE BY-LAW RULES

7.1 Introduction

s.s.5(1)9, of the DC Act, states that rules must be developed:

> "... to determine if a development charge is payable in any particular case and to determine the amount of the charge, subject to the limitations set out in subsection 6."

Paragraph 10 of the section goes on to state that the rules may provide for exemptions, phasing in and/or indexing of development charges.

s.s.5(6) establishes the following restrictions on the rules:

- the total of all development charges that would be imposed on anticipated development must not exceed the capital costs determined under 5(1) 2-8 for all services involved;

- if the rules expressly identify a type of development, they must not provide for it to pay development charges that exceed the capital costs that arise from the increase in the need for service for that type of development. However, this requirement does not relate to any particular development;

- if the rules provide for a type of development to have a lower development charge than is allowed, the rules for determining development charges may not provide for any resulting shortfall to be made up via other development.

With respect to "the rules," Section 6 states that a DC by-law must expressly address the matters referred to above re s.s.5(1) para. 9 and 10, as well as how the rules apply to the redevelopment of land.

The rules provided are based on the City's existing policies however, there are items under consideration at this time and these may be refined prior to adoption of the by-law.

It is noted that the policies provided for in the 2009 by-laws, as amended, are anticipated to continue with minor refinements which will be presented to Council for their consideration through a staff report. These rules will include such things as indexing provisions, payment terms, exemptions/reductions, timing of collection, phase-in options, etc. "Note that Appendix C clarifies the City's local service policy and recommends a refinement to require non-residential developments to construct their own stormwater facilities." The staff report will be circulated under separate cover at the same time this Background Study and the proposed DC By-laws are circulated.

7.2 Other Recommendations

It is recommended that Council:

"Whenever appropriate, request that grants, subsidies and other contributions be clearly designated by the donor as being to the benefit of existing development (or new development as applicable)";

"Adopt the assumptions contained herein as an 'anticipation' with respect to capital grants, subsidies and other contributions";

"Approve the capital project listing set out in Chapter 5 of the Development Charges Background Study dated May 20, 2011, subject to further annual review during the capital budget process";

"Approve the Development Charges Background Study dated May 20, 2011;

"Determine that no further public meeting is required"; and

"Approve the Development Charge By-law for Water, Wastewater, Stormwater, and GO Transit Services as presented by staff."

"Approve the Amendment to Development Charge By-law 09-143 (as amended), to remove Storm Water Drainage and Control Services, as presented by staff."

8. BY-LAW IMPLEMENTATION

8. BY-LAW IMPLEMENTATION

8.1 Public Consultation Process

8.1.1 Introduction

This chapter addresses the mandatory, formal public consultation process (Section 8.1.2), as well as the optional, informal consultation process (Section 8.1.3). The latter is designed to seek the co-operation and involvement of those involved, in order to produce the most suitable policy. Section 8.1.4 addresses the anticipated impact of the development charge on development, from a generic viewpoint.

8.1.2 Public Meeting of Council

Section 12 of the DCA, 1997 indicates that before passing a development charge by-law, Council must hold at least one public meeting, giving at least 20 clear days notice thereof, in accordance with the Regulation. Council must also ensure that the proposed by-law and background report are made available to the public at least two weeks prior to the (first) meeting.

Any person who attends such a meeting may make representations related to the proposed by-law.

If a proposed by-law is changed following such a meeting, the Council must determine whether a further meeting (under this section) is necessary (i.e. if the by-law which is proposed for adoption has been changed in any respect, the Council should formally consider whether an additional public meeting is required, incorporating this determination as part of the final by-law or associated resolution. It is noted that Council's decision, once made, is final and not subject to review by a Court or the OMB).

8.1.3 Other Consultation Activity

There are three broad groupings of the public who are generally the most concerned with municipal development charge policy:

1. The residential development community, consisting of land developers and builders, who are typically responsible for generating the majority of the development charge revenues. Others, such as realtors, are directly impacted by development charge policy. They are therefore potentially interested in all aspects of the charge, particularly the quantum by unit type, projects to be funded by the DC and the timing thereof, and

municipal policy with respect to development agreements, DC credits and front-ending requirements.

2. The second public grouping embraces the public at large and includes taxpayer coalition groups and others interested in public policy (e.g. in encouraging a higher non-automobile modal split).

3. The third grouping is the industrial/commercial/institutional development sector, consisting of land developers and major owners or organizations with significant construction plans, such as hotels, entertainment complexes, shopping centres, offices, industrial buildings and institutions. Also involved are organizations such as Industry Associations, the Chamber of Commerce, the Board of Trade and the Economic Development Agencies, who are all potentially interested in municipal development charge policy. Their primary concern is frequently with the quantum of the charge, gross floor area exclusions such as basement, mechanical or indoor parking areas, or exemptions and phase-in or capping provisions in order to moderate the impact.

The City has ensured that all of these groups have had an opportunity to provide input during the study process by establishing a Development Charge Stakeholder Committee. Through this committee, the preliminary projects, charges and policies have been presented and commented on prior to the preparation of the final Background Study report.

8.2 Anticipated Impact of the Charge on Development

The establishment of sound development charge policy often requires the achievement of an acceptable balance between two competing realities. The first is that high non-residential development charges can, to some degree, represent a barrier to increased economic activity and sustained industrial/commercial growth, particularly for capital intensive uses. Also, in many cases, increased residential development charges can ultimately be expected to be recovered via higher housing prices and can impact project feasibility in some cases (e.g. rental apartments).

On the other hand, development charges or other municipal capital funding sources need to be obtained in order to help ensure that the necessary infrastructure and amenities are installed. The timely installation of such works is a key initiative in providing adequate service levels and in facilitating strong economic growth, investment and wealth generation.

8.3 Implementation Requirements

8.3.1 Introduction

Once the City has calculated the charge, prepared the complete Background Study, carried out the public process and passed a new by-law, the emphasis shifts to implementation matters.

These include notices, potential appeals and complaints, credits, front-ending agreements, subdivision agreement conditions and finally the collection of revenues and funding of projects.

The following sections overview requirements in each case.

8.3.2 Notice of Passage

In accordance with s.13 of the DCA, when a DC by-law is passed, the municipal clerk shall give written notice of the passing and of the last day for appealing the by-law (the day that is 40 days after the day it was passed). Such notice must be given not later than 20 days after the day the by-law is passed (i.e. as of the day of newspaper publication or the mailing of the notice).

Section 10 of O.Reg. 82/98 further defines the notice requirements which are summarized as follows:

- Notice may be given by publication in a newspaper which is (in the Clerk's opinion) of sufficient circulation to give the public reasonable notice, or by personal service, fax or mail to every owner of land in the area to which the by-law relates;
- s.s.10 (4) lists the persons/organizations who must be given notice;
- s.s.10 (5) lists the eight items which the notice must cover.

8.3.3 By-law Pamphlet

In addition to the "notice" information, the municipality must prepare a "pamphlet" explaining each development charge by-law in force, setting out:

- a description of the general purpose of the development charges;
- the "rules" for determining if a charge is payable in a particular case and for determining the amount of the charge;
- the services to which the development charges relate; and
- a general description of the general purpose of the Treasurer's statement and where it may be received by the public.

Where a by-law is not appealed to the OMB, the pamphlet must be readied within 60 days after the by-law comes into force. Later dates apply to appealed by-laws.

The City must give one copy of the most recent pamphlet without charge, to any person who requests one.

8.3.4 Appeals

Sections 13-19 of the DCA, 1997 set out requirements relative to making and processing of a DC by-law appeal and OMB Hearing in response to an appeal. Any person or organization may appeal a DC by-law to the OMB by filing with the municipal clerk a notice of appeal, setting out the objection to the by-law and the reasons supporting the objection. This must be done by the last day for appealing the by-law, which is 40 days after the by-law is passed.

The City is carrying out a public consultation process, in order to address the issues which come forward as part of that process, thereby avoiding or reducing the need for an appeal to be made.

8.3.5 Complaints

A person required to pay a development charge, or his agent may complain to Municipal Council imposing the charge that:

- the amount of the charge was incorrectly determined;
- the credit to be used against the development charge was incorrectly determined; or
- there was an error in the application of the development charge.

Sections 20-25 of the DCA, 1997 set out the requirements that exist, including the fact that a complaint may not be made later than 90 days after a DC (or any part of it) is payable. A complainant may appeal the decision of Municipal Council to the OMB.

8.3.6 Credits

Sections 38-41 of the DCA, 1997 set out a number of credit requirements, which apply where a municipality agrees to allow a person to perform work in the future that relates to a service in the DC by-law.

These credits would be used to reduce the amount of development charges to be paid. The value of the credit is limited to the reasonable cost of the work which does not exceed the average level of service. The credit applies only to the service to which the work relates, unless

the municipality agrees to expand the credit to other services for which a development charge is payable.

8.3.7 Front-Ending Agreements

The City and one or more landowners may enter into a front-ending agreement which provides for the costs of a project which will benefit an area in the municipality to which the DC by-law applies. Such an agreement can provide for the costs to be borne by one or more parties to the agreement who are, in turn, reimbursed in future, by persons who develop land defined in the agreement.

Part III of the DCA, 1997 (Sections 44-58) addresses front-ending agreements and removes some of the obstacles to their use which were contained in the DCA, 1989. Accordingly, the City assesses whether this mechanism is appropriate for its use, as part of funding projects prior to Municipal funds being available.

8.3.8 Severance and Subdivision Agreement Conditions

Section 59 of the DCA, 1997 prevents a municipality from imposing directly or indirectly, a charge related to development or a requirement to construct a service related to development, by way of a condition or agreement under s.51 or s.53 of the *Planning Act*, except for:

- "local services, related to a plan of subdivision or within the area to which the plan relates, to be installed or paid for by the owner as a condition of approval under section 51 of the *Planning Act;*"

- "local services to be installed or paid for by the owner as a condition of approval under Section 53 of the *Planning Act*."

It is also noted that s.s.59 (4) of the DCA, 1997 requires that the municipal approval authority for a draft plan of subdivision under s.s.51 (31) of the *Planning Act,* use its power to impose conditions to ensure that the first purchaser of newly subdivided land is informed of all the development charges related to the development, at the time the land is transferred.

In this regard, if the municipality in question is a commenting agency, in order to comply with subsection 59(4) of the *Development Charges Act, 1997* it would need to provide to the approval authority, information regarding the applicable municipal development charges related to the site.

If the municipality is an approval authority for the purposes of section 51 of the *Planning Act*, it would be responsible to ensure that it collects information from all entities which can impose a development charge.

The most effective way to ensure that purchasers are aware of this condition would be to require it as a provision in a registered subdivision agreement, so that any purchaser of the property would be aware of the charges at the time the title was searched prior to closing a transaction conveying the lands.

APPENDIX A
BACKGROUND INFORMATION ON RESIDENTIAL AND NON-RESIDENTIAL GROWTH FORECAST

SCHEDULE 1
CITY OF HAMILTON
RESIDENTIAL GROWTH FORECAST SUMMARY

Year	Population (Excluding Census Undercount)	Population (Including Census Undercount)[1]	Housing Units					
			Singles & Semi-Detached	Multiple Dwellings[2]	Apartments[3]	Other	Total Households	Person Per Unit (PPU)
Mid 2006	504,559	517,815	118,410	25,095	50,155	795	194,455	2.59
Mid 2011	521,348	535,045	124,257	28,240	51,118	795	204,410	2.55
Mid 2021	551,931	566,431	136,060	35,672	56,633	795	229,160	2.41
Mid 2031	642,862	659,751	148,481	45,062	81,859	795	276,197	2.33
Mid 2006 - Mid 2011	**16,789**	**17,230**	**5,847**	**3,145**	**963**	**0**	**9,955**	
Mid 2011 - Mid 2021	**30,583**	**31,386**	**11,803**	**7,432**	**5,515**	**0**	**24,750**	
Mid 2011 - Mid 2031	**121,514**	**124,706**	**24,224**	**16,822**	**30,741**	**0**	**71,787**	

Source: Watson & Associates Economists Ltd., May, 2011.

1. Census Undercount estimated at approximately 2.63% (provided by the City of Hamilton). Note: Population figures have been rounded.
2. Includes townhomes and apartments in duplexes.
3. Includes bachelor, 1 bedroom and 2 bedroom+ apartments.

SCHEDULE 2
CITY OF HAMILTON
CURRENT YEAR GROWTH FORECAST
MID 2006 TO MID 2011

			POPULATION
Mid 2006 Population (1)			504,559
Occupants of New Housing Units, Mid 2006 to Mid 2011	*Units (2)*	9,955	
	multiplied by persons per unit (3)	2.90	
	gross population increase	28,849	28,849
Decline in Housing Unit Occupancy, Mid 2006 to Mid 2011	*Units (4)*	194,455	
	multiplied by ppu decline rate (5)	-0.0620	
	total decline in population	-12,060	-12,060
Population Estimate to Mid 2011			521,348
Net Population Increase, Mid 2006 to Mid 2011			*16,789*

(1) 2006 population based on City of Hamilton population unadjusted for Census Undercount.

(2) 2006-2011 Units are based on 2006-2010 Statistics Canada Building Permits

(3) Average number of persons per unit (ppu) is assumed to be:

Structural Type	Persons Per Unit[1]	% Distribution of Estimated Units[2]	Weighted Persons Per Unit Average
Singles & Semi Detached	3.40	59%	2.00
Multiples (6)	2.29	32%	0.72
Apartments (7)	1.84	10%	0.18
Total		100%	2.90

[1] Based on 2006 Census custom database

[2] Based on Building permit/completion acitivty

(4) 2006 households from City of Hamilton

(5) Decline occurs due to aging of the population and family life cycle changes, lower fertility rates and changing economic conditions.

(6) Includes townhomes and apartments in duplexes.

(7) Includes bachelor, 1 bedroom and 2 bedroom+ apartments.

SCHEDULE 3
CITY OF HAMILTON
TEN YEAR GROWTH FORECAST
MID 2011 TO MID 2021

			POPULATION
Mid 2011 Population (1)			521,348
Occupants of New Housing Units, Mid 2011 to Mid 2021	*Units (2)*	24,750	
	multiplied by persons per unit (3)	2.73	
	gross population increase	67,619	67,619
Decline in Housing Unit Occupancy, Mid 2011 to Mid 2021	*Units (4)*	204,410	
	multiplied by ppu decline rate (5)	-0.1812	
	total decline in population	-37,036	-37,036
Population Estimate to Mid 2021			551,931
Net Population Increase, Mid 2011 to Mid 2021			*30,583*

(1) Mid 2011 population is based on:

2006 Population (504,559) + Mid 2006 to Mid 2011 estimated housing units to beginning of forecast period (9,955 x 2.898 = 28,849) + (194,455 x -0.062 = -12,060) = 521,348

(2) Based upon forecast building permits/completions assuming a lag between construction and occupancy.

(3) Average number of persons per unit (ppu) is assumed to be:

Structural Type	Persons Per Unit[1]	% Distribution of Estimated Units[2]	Weighted Persons Per Unit Average
Singles & Semi Detached	3.39	48%	1.62
Multiples (6)	2.43	30%	0.73
Apartments (7)	1.73	22%	0.39
one bedroom or less	1.40		
two bedrooms or more	2.10		
Residential Facility Dwelling Unit	1.10		
Total		100%	2.73

[1] Persons per unit based on adjusted Statistics Canada Custom 2006 Census database.

[2] Forecast unit mix based upon historical trends and housing units in the development process.

(4) Mid 2011 households based upon 194,455 (City of Hamilton) + 9,955 (Mid 2006 to Mid 2011 unit estimate) = 204,410

(5) Decline occurs due to aging of the population and family life cycle changes, lower fertility rates and changing economic conditions.

(6) Includes townhomes and apartments in duplexes.

(7) Includes bachelor, 1 bedroom and 2 bedroom+ apartments.

SCHEDULE 4
CITY OF HAMILTON
TWENTY YEAR GROWTH FORECAST
MID 2011 TO MID 2031

			POPULATION
Mid 2011 Population (1)			521,348
Occupants of New Housing Units, Mid 2011 to Mid 2031	*Units (2)*	71,787	
	multiplied by persons per unit (3)	2.45	
	gross population increase	176,164	176,164
Decline in Housing Unit Occupancy, Mid 2011 to Mid 2031	*Units (4)*	204,410	
	multiplied by ppu decline rate (5)	-0.2674	
	total decline in population	-54,651	-54,651
Population Estimate to Mid 2031			642,862
Net Population Increase, Mid 2011 to Mid 2031			*121,514*

(1) Mid 2011 population is based on:

2006 Population (504,559) + Mid 2006 to Mid 2011 estimated housing units to beginning of forecast period (9,955 x 2.898 = 28,849) + (194,455 x -0.062 = -12,060) = 521,348

(2) Based upon forecast building permits/completions assuming a lag between construction and occupancy.

(3) Average number of persons per unit (ppu) is assumed to be:

Structural Type	Persons Per Unit[1]	% Distribution of Estimated Units[2]	Weighted Persons Per Unit Average
Singles & Semi Detached	3.39	34%	1.14
Multiples (6)	2.43	23%	0.57
Apartments (7)	1.73	43%	0.74
one bedroom or less	1.40		
two bedrooms or more	2.10		
Residential Facility Dwelling Unit	1.10		
Total		100%	2.45

[1] Persons per unit based on adjusted Statistics Canada Custom 2006 Census database.

[2] Forecast unit mix based upon historical trends and housing units in the development process.

(4) Mid 2011 households based upon 194,455 (City of Hamilton) + 9,955 (Mid 2006 to Mid 2011 unit estimate) = 204,410

(5) Decline occurs due to aging of the population and family life cycle changes, lower fertility rates and changing economic conditions.

(6) Includes townhomes and apartments in duplexes.

(7) Includes bachelor, 1 bedroom and 2 bedroom+ apartments.

SCHEDULE 5

CITY OF HAMILTON
HISTORICAL RESIDENTIAL BUILDING PERMITS
YEARS 2001 - 2010

Year	RESIDENTIAL BUILDING PERMITS			
	Singles & Semi Detached	Multiples[1]	Apartments[2]	Total
2001	1,277	588	413	2,278
2002	1,637	522	220	2,379
2003	1,087	436	136	1,659
2004	1,353	672	419	2,444
2005	1,130	716	504	2,350
Sub-total	6,484	2,934	1,692	11,110
Average (2001 - 2005)	***1,297***	***587***	***338***	***2,222***
% Breakdown	58.4%	26.4%	15.2%	100.0%
2006	1,356	529	406	2,291
2007	1,153	658	132	1,943
2008	1,099	868	161	2,128
2009	723	359	143	1,225
2010	1,516	731	121	2,368
Sub-total	5,847	3,145	963	9,955
Average (2006 - 2010)	***1,169***	***629***	***193***	***1,991***
% Breakdown	58.7%	31.6%	9.7%	100.0%
2001 - 2010				
Total	12,331	6,079	2,655	21,065
Average	***1,233***	***608***	***266***	***2,107***
% Breakdown	58.5%	28.9%	12.6%	100.0%

Sources:

Building Permits - Statistics Canada Publication, 64-001XIB

2010 Estimated based on Monthly permit data

1. Includes townhomes and apartments in duplexes.

2. Includes bachelor, 1 bedroom and 2 bedroom+ apartments.

SCHEDULE 6

CITY OF HAMILTON
PERSONS PER UNIT BY AGE AND TYPE OF DWELLING
(2006 CENSUS)

Age of Dwelling	SINGLES AND SEMI-DETACHED							
	< 1 BR	1 BR	2 BR	3/4 BR	5+ BR	Total	Adjusted PPU[1]	20 Year Average
1-5	-	2.450	2.259	3.453	4.879	**3.400**	3.35	
6-10	-	1.941	2.065	3.485	4.447	**3.389**	3.34	
11-15	-	1.769	2.175	3.359	5.085	**3.418**	3.38	
16-20	-	2.278	2.371	3.479	4.488	**3.516**	3.49	3.39
20-25	-	2.000	2.235	3.273	4.087	**3.287**	3.27	
25-35	-	2.172	2.241	2.965	4.131	**2.972**	2.96	
35+	2.222	1.632	1.996	2.766	3.764	**2.614**	2.61	
Total	**2.208**	**1.740**	**2.031**	**3.005**	**4.116**	**2.892**		

Age of Dwelling	MULTIPLES[2]							
	< 1 BR	1 BR	2 BR	3/4 BR	5+ BR	Total	Adjusted PPU[1]	20 Year Average
1-5	-	1.625	1.825	2.528	-	**2.289**	2.20	
6-10	-	1.808	1.726	2.723	2.818	**2.349**	2.24	
11-15	-	1.939	1.945	3.036	-	**2.743**	2.64	
16-20	-	1.560	2.031	2.972	-	**2.715**	2.63	2.43
20-25	-	1.333	1.901	3.111	-	**2.799**	2.74	
25-35	-	1.526	2.224	2.992	2.273	**2.821**	2.78	
35+	1.111	1.428	2.108	2.946	3.417	**2.443**	2.42	
Total	**1.146**	**1.527**	**2.005**	**2.916**	**3.410**	**2.569**		

Age of Dwelling	APARTMENTS[3]							
	< 1 BR	1 BR	2 BR	3/4 BR	5+ BR	Total	Adjusted PPU[1]	20 Year Average
1-5	-	1.660	1.943	2.267	-	**1.838**	1.80	
6-10	1.375	1.500	1.727	2.923	-	**1.706**	1.67	
11-15	1.368	1.307	1.941	3.195	-	**1.753**	1.73	
16-20	1.667	1.356	1.845	3.571	-	**1.736**	1.72	1.73
20-25	1.645	1.355	1.901	3.054	-	**1.697**	1.68	
25-35	1.549	1.343	2.068	2.698	-	**1.769**	1.76	
35+	1.333	1.328	1.998	2.873	2.510	**1.716**	1.71	
Total	**1.406**	**1.339**	**1.995**	**2.866**	**2.556**	**1.731**		

Age of Dwelling	ALL DENSITY TYPES					
	< 1 BR	1 BR	2 BR	3/4 BR	5+ BR	Total
1-5	1.571	1.808	2.000	3.223	4.855	**2.988**
6-10	1.318	1.679	1.851	3.317	4.214	**2.984**
11-15	1.545	1.434	1.990	3.271	5.087	**2.931**
16-20	1.600	1.453	2.006	3.387	4.482	**3.108**
20-25	1.625	1.381	1.955	3.238	4.073	**2.851**
25-35	1.571	1.371	2.105	2.954	3.931	**2.483**
35+	1.366	1.371	2.006	2.784	3.651	**2.349**
Total	**1.439**	**1.392**	**2.011**	**2.987**	**4.002**	**2.549**

1. The Census PPU has been adjusted to account for the downward PPU trend which has been recently experienced in both new and older units, largely due to the aging of the population

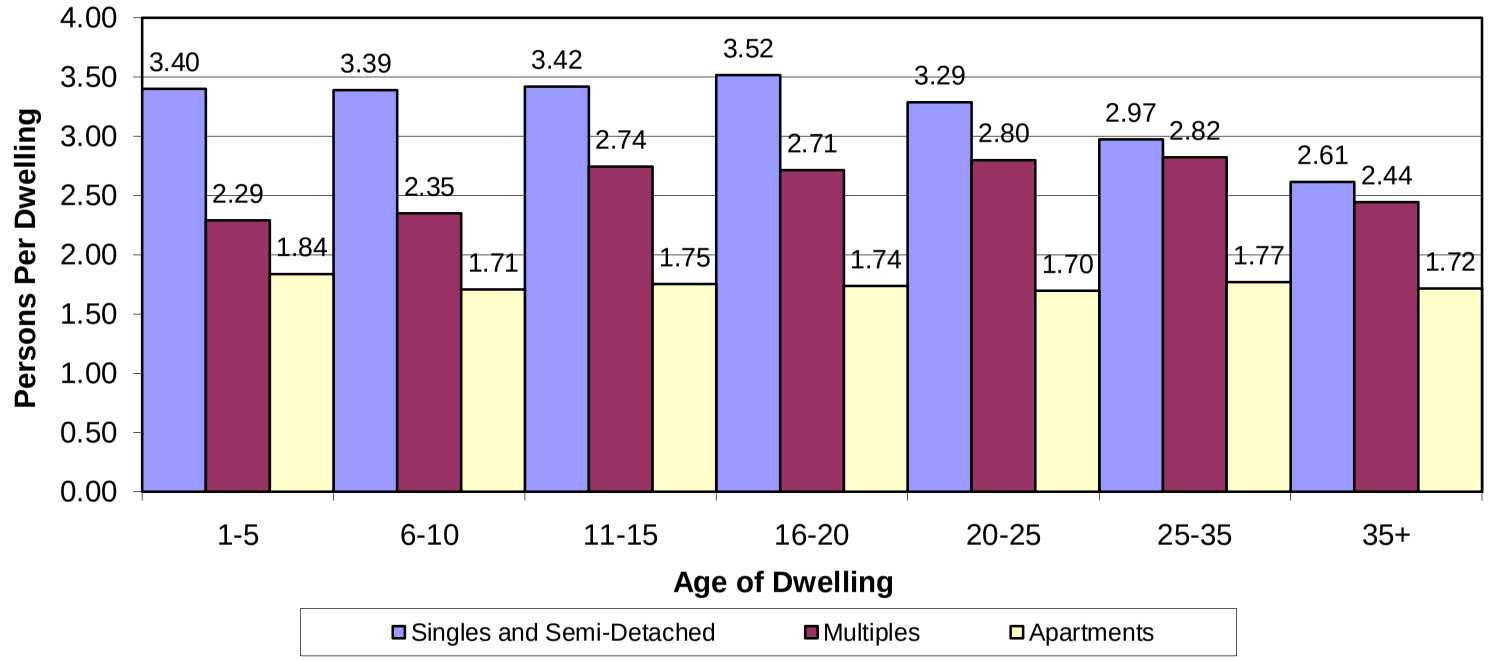
2. Includes townhomes and apartments in duplexes.

3. Includes bachelor, 1 bedroom and 2 bedroom+ apartments.

Note: Does not include Statistics Canada data classified as 'Other'

PPU Not calculated for samples less than or equal to 50 dwelling units, and does not include institutional population

SCHEDULE 7
CITY OF HAMILTON
PERSONS PER UNIT BY STRUCTURAL TYPE AND AGE OF DWELLING
(2006 CENSUS)



SCHEDULE 8
CITY OF HAMILTON
EMPLOYMENT AND GROSS FLOOR AREA (GFA) FORECAST, 2011 TO 2031

Period	Population	Activity Rate						Employment								Gross Floor Area in Square Feet (Estimated)[1]			
		Primary	Work at Home	Industrial	Commercial/ Population Related	Institutional	Total	Primary	Work at Home	Industrial	Commercial/ Population Related	Institutional	Total	NFPOW	Total w/ NFPOW	Industrial	Commercial/ Population Related	Institutional	Total
2006	504,559	0.004	0.027	0.111	0.139	0.110	0.391	2,050	13,580	55,950	70,305	55,300	197,185	24,395	221,580				
Mid 2011	521,348	0.004	0.029	0.109	0.149	0.111	0.402	2,121	14,866	56,628	77,919	57,791	209,325	25,383	234,708				
Mid 2021	551,931	0.004	0.031	0.120	0.159	0.117	0.430	2,293	16,858	66,384	87,595	64,317	237,447	27,075	264,522				
Mid 2031	642,862	0.004	0.030	0.123	0.153	0.110	0.419	2,513	18,974	78,951	98,133	70,952	269,523	30,477	300,000				
Incremental Change																			
2006 - Mid 2011	16,789	0.0000	0.0016	-0.0023	0.0101	0.0012	0.0107	71	1,286	678	7,614	2,491	12,140	988	13,128				
Mid 2011 - Mid 2021	30,583	0.0001	0.0020	0.0117	0.0092	0.0057	0.0287	172	1,992	9,756	9,676	6,526	28,122	1,692	29,814	9,756,000	3,870,400	4,568,200	18,194,600
Mid 2011 - Mid 2031	121,514	-0.0002	0.0010	0.0142	0.0032	-0.0005	0.0177	392	4,108	22,323	20,214	13,161	60,198	5,094	65,292	22,323,000	8,085,600	9,212,700	39,621,300
Annual Average																			
2006 - Mid 2011	3,358	0.0000	0.0003	-0.0005	0.0020	0.0002	0.0021	14	257	136	1,523	498	2,428	198	2,626				
Mid 2011 - Mid 2021	3,058	0.00001	0.00020	0.00117	0.00092	0.00057	0.00287	17	199	976	968	653	2,812	169	2,981	975,600	387,040	456,820	1,819,460
Mid 2011 - Mid 2031	6,076	-0.00001	0.00005	0.00071	0.00016	-0.00002	0.00089	20	205	1,116	1,011	658	3,010	255	3,265	1,116,150	404,280	460,635	1,981,065

Source: 2006 based on Census. Forecast based on City of Hamilton (2008) for 2011, 2021 and 2031 interpolated by W&A. The employment by type is based on the relationship between employment land uses identified in GGH Outlook (Hemson, 2005) and employment sectors.

1. Square Foot Per Employee Assumptions

Industrial	1,000
Commercial/ Population Related	400
Institutional	700

SCHEDULE 9
CITY OF HAMILTON
NON-RESIDENTIAL CONSTRUCTION VALUE
YEARS 2000 - 2009
(000's 2011 $)

YEAR	Industrial				Commercial				Institutional				Total			
2000				73,530				117,075				141,737				332,342
2001				52,720				137,111				143,947				333,778
Sub-total				126,250				254,185				285,684				829,903
Average				***63,125***				***127,093***				***142,842***				***276,634***
	New	Improve	Additions	Total	New	Improve	Additions	Total	New	Improve	Additions	Total	New	Improve	Additions	Total
2002	13,588	6,156	4,261	24,006	125,119	45,131	13,730	183,980	141,786	60,696	16,494	218,977	280,493	111,984	34,485	426,962
2003	57,181	5,402	7,862	70,446	34,666	32,235	13,475	80,376	166,415	40,213	145,776	352,404	258,263	77,850	167,113	503,226
2004	17,960	13,080	6,974	38,014	57,985	34,756	2,633	95,375	51,104	25,270	16,916	93,290	127,049	73,107	26,523	226,679
2005	4,625	3,459	0	8,084	83,676	30,397	7,622	121,695	39,711	88,466	33,802	161,979	128,012	122,322	41,424	291,757
2006	5,976	2,175	3,466	11,616	50,909	44,089	10,745	105,743	79,823	45,510	3,088	128,421	136,707	91,773	17,300	245,780
2007	5,139	1,985	16,573	23,697	60,146	59,420	1,381	120,947	48,442	38,492	129,527	216,461	113,727	99,896	147,481	361,104
2008	20,859	1,138	263	22,261	85,791	45,198	1,968	132,956	16,749	30,577	156,951	204,278	123,399	76,913	159,182	359,494
2009	16,614	5,075	1,621	23,310	132,262	52,483	6,513	191,257	37,505	102,469	25,264	165,238	186,380	160,026	33,398	379,805
Subtotal	141,942	38,470	41,021	221,433	630,553	343,708	58,067	1,032,328	581,535	431,693	527,819	1,541,047	1,354,030	813,871	626,907	2,794,808
Percent of Total	64%	17%	19%	100%	61%	33%	6%	100%	38%	28%	34%	100%	48%	29%	22%	100%
Average	***17,743***	***4,809***	***5,128***	***27,679***	***78,819***	***42,963***	***7,258***	***129,041***	***72,692***	***53,962***	***65,977***	***192,631***	***169,254***	***101,734***	***78,363***	***349,351***
2000 - 2009																
10 Year Total				347,683				1,286,513				1,826,731				3,244,906
10 Year Average				***34,768***				***128,651***				***182,673***				***324,491***
% Breakdown				10.7%				39.6%				56.3%				100.0%

SOURCE: STATISTICS CANADA PUBLICATION, 64-001-XIB
Note: Inflated to year-end 2010 (January, 2011) dollars using Reed Construction Cost Index

SCHEDULE 10

CITY OF HAMILTON

EMPLOYMENT TO POPULATION RATIO BY MAJOR EMPLOYMENT SECTOR, 1996 TO 2006

		Year			Change		
		1996	2001	2006	96-01	01-06	Comments
Employment by industry							
1.0	**Primary Industry Employment**						Categories which relate to
1.1	*All primary*	3,505	2,940	3,195	-565	255	local land-based resources.
	Sub-total	**3,505**	**2,940**	**3,195**	**-565**	**255**	
2.0	**Industrial and Other Employment**						
2.1	*Manufacturing*	40,365	38,140	32,900	-2,225	-5,240	Categories which relate
2.2	*Wholesale trade*	8,190	6,690	7,645	-1,500	955	primarily to industrial land
2.3	*Construction*	5,895	6,260	6,800	365	540	supply and demand.
2.4	*Transportation, storage, communication and other utility*	9,415	11,298	11,900	1,883	603	
	Sub-total	**63,865**	**62,388**	**59,245**	**-1,478**	**-3,143**	
3.0	**Population Related Employment**						
3.1	*Retail trade*	24,915	23,980	23,885	-935	-95	Categories which relate
3.2	*Finance, insurance, real estate operator and insurance agent*	9,545	10,250	10,270	705	20	primarily to population
3.3	*Business service*	8,835	14,693	15,880	5,858	1,188	growth within the
3.4	*Accommodation, food and beverage and other service*	24,470	25,435	27,395	965	1,960	municipality.
	Sub-total	**67,765**	**74,358**	**77,430**	**6,593**	**3,073**	
4.0	**Institutional**						
4.1	*Government Service*	7,385	7,360	8,805	-25	1,445	
4.2	*Education service, Health, Social Services*	41,615	41,325	48,510	-290	7,185	
	Sub-total	**49,000**	**48,685**	**57,315**	**-315**	**8,630**	
	Total Employment	**184,135**	**188,370**	**197,185**	**4,235**	**8,815**	
	Population	**467,799**	**490,268**	**504,559**	**22,469**	**14,291**	
	Employment to Population Ratio						
	Industrial and Other Employment	**0.14**	**0.13**	**0.12**	**-0.01**	**-0.01**	
	Population Related Employment	**0.14**	**0.15**	**0.15**	**0.01**	**0.00**	
	Institutional Employment	**0.10**	**0.10**	**0.11**	**-0.01**	**0.01**	
	Primary Industry Employment	**0.01**	**0.01**	**0.01**	**0.00**	**0.00**	
	Total	**0.39**	**0.38**	**0.39**	**-0.01**	**0.01**	

Source: Statistics Canada Employment by Place of Work

Note: 1996-2006 employment figures are classified by Standard Industrial Classification (SIC) Code

APPENDIX B
LONG TERM CAPITAL AND OPERATING COST EXAMINATION

APPENDIX B - LONG TERM CAPITAL AND OPERATING COST EXAMINATION

CITY OF HAMILTON
ANNUAL CAPITAL AND OPERATING COST IMPACT

As a requirement of the *Development Charges Act, 1997* under subsection 10(2)(c), an analysis must be undertaken to assess the long term capital and operating cost impacts for the capital infrastructure projects identified within the development charge. As part of this analysis, it was deemed necessary to isolate the incremental operating expenditures directly associated with these capital projects, factor in cost saving attributable to economies of scale or cost sharing where applicable, and prorate the cost on a per unit basis (i.e. square foot of building space, per vehicle, etc.). This was undertaken through a review of the City's expenditures as per the 2009 FIR.

In addition to the operational impacts, over time the initial capital projects will require replacement. This replacement of capital is often referred to as life cycle cost. By definition, life cycle costs are all the costs which are incurred during the life of a physical asset, from the time its acquisition is first considered, to the time it is taken out of service for disposal or redeployment. The method selected for life cycle costing is the sinking fund method which provides that money will be contributed annually and invested, so that those funds will grow over time to equal the amount required for future replacement. The following factors were utilized to calculate the annual replacement cost of the capital projects (annual contribution = factor X capital asset cost) and are based on an annual growth rate of 2% (net of inflation) over the average useful life of the asset:

ASSET	LIFE CYCLE COST FACTORS	
	AVERAGE USEFUL LIFE (YEARS)	FACTOR
Stormwater	80	0.00516
Water	80	0.00516
Wastewater	80	0.00516

Table B-1 depicts the annual operating impact resulting from the proposed gross capital projects at the time they are all in place. It is important to note that, while municipal program expenditures will increase with growth in population, the costs associated with the new infrastructure (i.e. facilities) would be delayed until the time these works are in place. Note that there is no direct operating impact on the GO Transit service for the City of Hamilton.

Table B-1
CITY OF HAMILTON
OPERATING AND CAPITAL EXPENDITURE IMPACTS
FOR FUTURE CAPITAL EXPENDITURES

SERVICE	NET GROWTH RELATED EXPENDITURES	ANNUAL LIFECYCLE EXPENDITURES	ANNUAL OPERATING EXPENDITURES	TOTAL ANNUAL EXPENDITURES
1. Stormwater Drainage and Control Services				
1.1 Channels, drainage and studies	53,927,639	278,300	67,920	346,220
1.2 Residenital Ponds	211,200,864	1,089,900	265,999	1,355,899
2. Wastewater Services				
2.1 Treatment plants	334,700,976	1,727,300	5,524,729	7,252,029
2.2 Sewers	318,614,178	1,644,300	5,259,193	6,903,493
3. Water Services				
3.1 Distribution systems	239,910,372	1,238,100	7,480,931	8,719,031

APPENDIX C
LOCAL SERVICE POLICY
FOR WATER, WASTEATER AND STORMWATER SERVICES

APPENDIX C - LOCAL SERVICE POLICY FOR WATER, WASTEWATER AND STORMWATER SERVICES

Storm Sewer Oversizing (Residential and Non-Residential)

- Oversizing will be applied only to a storm sewer system that provides for the drainage and conveyance of runoff resulting from a design storm event having a 5 year return period (minor system).
- Development Charge contribution for storm sewer oversizing is applicable for sewers in excess of 1200mm diameter.
- Storm sewers conveying a 1 in 100 year design (major system) will not be eligible for "oversizing".
- DC contribution for "oversizing" is on a flat rate basis as outlined in the City's Financial Policies, per Council-approved Reports PED03060 and FCS03073 and related appendices/amendments.
- "Oversizing" will not be applied to temporary works.

Stormwater Management Facilities

Residential:

- Centralized stormwater management facilities identified in the City's Stormwater Master Plan, Master Drainage Plan or Watershed/Subwatershed Study will be considered for inclusion as development charges projects.
- Development charge contributions for facilities will be limited based on the total cost (land and capital costs) as outlined in the DC Background Study. Included in the capital cost is engineering design and soft costs for each facility.
- Storm sewer conveyance system to the SWM facility is considered local service and not eligible for DC contribution. Piping and headwall for the conveyance system into the SWM facility is developer responsibility.
- Residential land cost for SWM facilities have been set at $360,000/Ac, except for Ancaster and Waterdown which has been set at $450,000/Ac. Facilities located in open space lands, the value of the land will be based on open space value, not developable land, and will be established by an independent appraisal, provided by the developer.

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The value of compensation for land will be based on the appraisal up to the maximum value of land in the DC background study.

- Developer will be responsible to acquire lands for facilities located outside a plan of subdivision. The City will not act as a third party agent in the negotiation and acquisition of lands for stormwater management facilities on behalf of private interest, unless otherwise directed by Council. The value of compensation for land will be determined by an independent appraisal, provided by the developer up to the maximum value of land in the DC background study.
- Where a developer has constructed a facility as a condition of development, at his own cost and the facility is considered to be permanent and part of an ultimate solution, credit for the related stormwater component will be applied for the un-built units within the subdivision.
- Capital cost may include items as follows:
- Siltation control
- Excavation (excludes costs to haul surplus material off site and/or placement and compaction of surplus material within subdivision)
- Fine grading
- Decanting area
- Forebay structures, pond liner, cooling trenches, etc.
- SWMP outlet structures (ditch inlet, manhole, pipe, etc.) within pond to the first structure outside of the pond (outlet works beyond this is developer responsibility)
- Emergency overland flow route
- Maintenance access road
- Landscaping/Shading
- Pond signage
- Temporary outlet works including the acquisition of easements are developer responsibility
- Studies required to facilitate orderly development are developer responsibility
- Costs associated with construction monitoring during and post construction, including siltation/erosion remedial works is developer responsibility
- On-site open watercourse improvements are to be the responsibility of the individual developments.

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Non-Residential

- Non-residential developers provide their stormwater management facilities directly.
- On-site open watercourse improvements are to be the responsibility of the individual developments.

Low Impact Residential Development

- City is supportive of the implementation of LID however; these measures are only effective through regular maintenance. Developments under Site Plan Control that incorporate LID measures, and only in the absence of an identified stormwater management facility to contribute to, may be eligible for a cost recovery of an amount equal to up to 75% of the stormwater Development Charge Payable. The details of this policy will be provided within a staff report which will accompany the DC Background study and draft DC by-law in June, 2011.

Sanitary and Watermain Oversizing (Residential and Non-Residential)

- Development Charge contribution for sanitary sewer oversizing is applicable for sewers in excess of 450mm diameter in residential and non-residential developments.
- Development Charge contribution for watermain oversizing is applicable for watermains in excess of 300mm diameter in residential and non-residential developments.
- DC contribution for "oversizing" is on a flat rate basis as outlined in the City's Financial Policies, per Council-approved Reports PED03060 and FCS03073 and related appendices/amendments.
- "Oversizing" will not be applied to temporary works.
- At intersections, the number of valves required is one less than the number of intersecting watermains (i.e. minimum 2 valves on a 3 way tee). Where a valve is required on an existing main as a result of a connection of a main to service a development, this is considered a local service and not eligible for development charges.

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APPENDIX D
DEVELOPMENT CHARGE RESERVE FUND POLICY

APPENDIX D - DEVELOPMENT CHARGE RESERVE FUND POLICY

D.1 Legislative Requirements

The DCA, 1997 requires development charge collections (and associated interest) to be placed in separate reserve funds. Sections 33 through 36 of the Act provide the following regarding reserve fund establishment and use:

- a municipality shall establish a reserve fund for each service to which the DC by-law relates; s.7(1), however, allows services to be grouped into categories of services for reserve fund (and credit) purposes, although only 100% eligible and 90% eligible services may be combined (minimum of two reserve funds);

- the municipality shall pay each development charge it collects into a reserve fund or funds to which the charge relates;

- the money in a reserve fund shall be spent only for the "capital costs" determined through the legislated calculation process (as per s.5(1) 2-8);

- money may be borrowed from the fund but must be paid back with interest (O.Reg. 82/98, s.11(1) defines this as Bank of Canada rate either on the day the by-law comes into force or, if specified in the by-law, the first business day of each quarter);

- DC reserve funds may not be consolidated with other municipal reserve funds for investment purposes (s.37).

Annually, the Treasurer of the municipality is required to provide Council with a financial statement related to the DC by-law(s) and reserve funds. This statement must also be forwarded to the Minister of Municipal Affairs and Housing within 60 days of the statement being filed with Council.

O.Reg. 82/98 prescribes the information that must be included in the Treasurer's statement, as follows:

- opening balance;
- closing balance;
- description of each service and/or service category for which the reserve fund was established;
- transactions for the year (e.g. collections, draws);

- list of credits by service or service category (outstanding at beginning of the year, given in the year and outstanding at the end of the year by holder);
- amounts borrowed, purpose of the borrowing and interest accrued during previous year;
- amount and source of money used by the municipality to repay municipal obligations to the fund;
- schedule identifying the value of credits recognized by the municipality, the service to which it applies and the source of funding used to finance the credit; and
- for each draw, the amount spent on the project from the DC reserve fund and the amount and source of any other monies spent on the project.

Based upon the above, Figure D-1 sets out the format for which annual reporting to Council should be provided.

D.2 DC Reserve Fund Application

Section 35 of the DCA states that:

> "The money in a reserve fund established for a service may be spent only for capital costs determined under paragraphs 2 to 8 of subsection 5(1)."

This provision clearly establishes that reserve funds collected for a specific service are only to be used for that service.

Figure D-1
Development Charge Reserve Fund
CITY OF HAMILTON
as at December 31, 201X

	GO Transit	Stormwater Drainage and Control Services	Wastewater Services - Plant	Wastewater Services - Linear	Water Services	Total
Balance as of January 1,						-
Plus:						
Development Charge Proceeds						-
Other						-
Accrued Interest Allocation						-
Sub-Total		**-**			**-**	**-**
Less:						
Amounts Transferred to Operating Fund						-
Amounts Transferred to Capital Fund						-
Sub-Total		-			-	-
Closing Balance as of December 31,		**-**			**-**	**-**

Attachment 1

SAMPLE DEVELOPMENT CHARGE RESERVE FUND STATEMENT
City of Hamilton
FOR THE YEAR _____

DISCOUNTED SERVICES RESERVE FUND TRANSFERS					
Capital Project	**DC Reserve Fund Draw**	**Operating Fund Draw**	**Other Reserves Fund Draw**	**Debt**	**Total**

Attachment 2

DEVELOPMENT CHARGE RESERVE FUND STATEMENT
City of Hamilton
FOR THE YEAR _____

LISTING OF CREDITS UNDER DCA, 1997, s.38 BY HOLDER					
Credit Holder	**Applicable DC Reserve Fund**	**Credit Balance - Beginning of Year**	**Additional Credits Granted During Year**	**Credits Used by Holder During Year**	**Credit Balance - End of Year**

APPENDIX E
WATER AND WASTEWATER SERVICING NEEDS
AECOM

City of Hamilton

2011 Hamilton Development Charges By-Law Update Water and Wastewater Projects

Appendix E

Prepared by:

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Project Number:

60189992

Date:

May 17, 2011

Table of Contents

Tables

Attachments

1. Introduction

This technical report is prepared as a background document for the City's Development Charges (DC) By-law. This is an update to the Development Charges Background Study, May 2009, prepared by Watson & Associates Economists Ltd. This document provides engineering input on growth related future costs of water and wastewater infrastructure upgrades and will be used to update the City's DC By-Law.

The objectives of this study are:

- Identify the demand that will be placed on the community's municipal water and wastewater system as a result of approved population and employment growth within the urban boundary to year 2031 consistent with Places To Grow.
- Recommend water and wastewater infrastructure required to service the expected growth needs out to the 2031 planning horizon.
- Provide growth related project cost estimates for water and wastewater infrastructure eligible for DC funding.

Section 5 describes the works required that are Development related for each urban area. The tables and figures in this report are organized with the digit and decimal (e.g. 2.2). The digit identifies the type of infrastructure, the decimal the urban area as follows (e.g. 2.2 Wastewater System, Ancaster).

Digit – Infrastructure

1. Water Distribution System
2. Wastewater System

Decimal – Area

1. Waterdown
2. Ancaster
3. Binbrook
4. AEGD/Mount Hope
5. Hamilton Mountain
6. Stoney Creek Upper
7. Stoney Creek Lower
8. Flamborough excluding Waterdown

Within the tables and figures, the projects are further identified with unique identifiers as follows:

W	Waterdown
A	Ancaster
B	Binbrook
MH	AEGD/Mount Hope
HM	Hamilton Mountain
SCU	Stoney Creek Upper
SCL	Stoney Creek Lower
F	Flamborough excluding Waterdown

W-09 water projects
S-09 wastewater projects

Example: W# - W - 09 represents a water project # in Waterdown
SCU# - S - 09 represents a wastewater project # in Stoney Creek Upper

We have also included a table for City-wide projects which lists proposed capital projects that affect the City's overall systems and are typically located outside the previously identified urban areas. General projects such as studies are also included; however, the majority of Citywide projects are being driven by and are benefitting growth. Treatment plant projects have been added to the charge as a separate item and are not listed in the City-Wide projects.

2. Development Areas

Through the development of GRIDS and the 2006 City of Hamilton Water and Wastewater Master Plan, the City's Planning Department developed expected population and employment targets to reach the Province's Places to Grow requirements to the Urban Boundary Buildout (UBBO) in 2031. This growth was focused in the following areas:

- Waterdown,
- Ancaster,
- Binbrook,
- Airport Employment Growth District (AEGD)/Mount Hope,
- Hamilton Mountain,
- Stoney Creek Lower, and
- Stoney Creek Upper.

All areas capable of being developed in the urban boundary are assumed to have densities and land uses in accordance with the City's Official Plan.

Subsequent to the GRIDS and Master Planning processes, additional study was undertaken for the Airport Employment Growth District (AEGD). A stand alone servicing master plan for the AEGD was developed and identified detailed servicing requirements. These recommendations have been incorporated into the DC Background Study infrastructure requirements.

For this DC Background Study, additional review was undertaken of the available land use and status of development across the City. Based on best available information, preliminary staging of infrastructure has been established.

3. Criteria for Development Charges Calculations

3.1 Project Categories

Utilizing the City's development assumptions, the water and wastewater infrastructure required to service these areas was identified. To determine if a project is a Development Charges related project, the following two categories were considered:

- Category 1: Projects external to proposed development lands (i.e. on existing road allowance, and/or where existing infrastructure is in place), and

- Category 2: Projects within proposed development lands.

Category 1 - Projects External to Proposed Development Lands

- Where existing City infrastructure requires upgrading to service new development based on the City's design standards. This will include watermains for transmission and looping.
- Where new infrastructure is required to service more than one proposed development property.

Category 2 - Projects on Proposed Development Lands

- Where sewage infrastructure is required to directly service the proposed development lands and potentially "oversized" in consideration of proposed developable as well as existing services/underserviced (non-developable) lands that normally drain to the proposed development property.
- Where water infrastructure is "oversized" to provide looping for domestic and fire protection flows for proposed development external to the subject lands.
- Where pumping stations/forcemains and reservoirs with associated lands are situated on future development property are "oversized" to service lands that normally drain (sewage) to the proposed site or service a designated service area (water).

3.2 Development Charges Policy and Criteria

3.2.1 Local Servicing Policy

In regards to Category 2 projects, the developer is required to pay for the full cost of the installation of sanitary sewers and watermain up to and including the following sizes on their property. This is described as the Direct Developers Contribution. The minimum sizes are provided from the City's Development Policies:

- Sanitary Sewer 450 mm diameter
- Watermain 300 mm diameter

Should the size of the local infrastructure be required to be greater than the minimum local servicing sizes (ie: to support external development), Development Charges contributions shall be made to sanitary sewer and watermain projects that exceed the minimum sizes listed above. The City shall contribute, through the Development Charges Fund, towards the cost to install the infrastructure on a "Flat Rate" basis. "Flat Rate" is defined as the cost difference between the size required for external development and the minimum size, noted above, in the City's Development Policies.

Where existing infrastructure will be required to be replaced as a result of proposed development, the City will contribute to the project based on benefit to the existing users. The City shall contribute towards the cost to install the infrastructure on a "Flat Rate" basis. Development Charge contributions shall not be made towards temporary works.

Projects identified are sized based on the City's engineering guidelines for design and established drainage/service areas.

3.2.2 Benefit To Existing

The non-growth component has been identified for certain projects which benefit the existing service area. These components are typically associated with upgrades to the existing systems or facilities necessary to continue to provide service to the existing residential and non-residential users. These projects may also involve upgrades or expansions which provide additional capacity to meet growth in the service area. As such, for each of these projects, the growth related and non-growth related needs and corresponding capacity and costs have been separately identified.

However, given that the servicing program is designed to service growth to 2031 and the infrastructure is primarily located in new growth areas, there are limited benefit to existing (non-growth) components in the capital program.

3.2.3 Post Period Oversizing

Project costs would be identified for any oversizing of infrastructure to service growth beyond the DC by-law planning period, in this case 2031.

Under this DC program, the local development area servicing is sized to service the specific development areas within the approved urban boundary. There is no post-period oversizing for these projects.

The trunk infrastructure is based on the City of Hamilton Master Plan. The Master Plan infrastructure and sizing was based on the growth plan projections and urban boundary established under GRIDS. This baseline data from GRIDS forecasted to the 2031 planning horizon. There is no post-period oversizing for the trunk infrastructure.

3.2.4 City-Wide Projects

The City has identified specific monitoring and programs that must be undertaken to evaluate the existing and future infrastructure requirements to service the City. For the most part, these are required for future development; however the existing infrastructure will have to be evaluated. An allowance has been made for City-Wide costs for these items.

Development related projects are listed in the tables identified by infrastructure (water and sewage) and by urban area. A City-wide project table is included with projects that do not lie within the listed urban areas or that provide City-wide benefit, such as studies.

3.2.5 Residential/Non-Residential Cost Share

The general intent of the cost share for water and wastewater infrastructure is based on proportion of flows attributed to residential and non-residential use. The proportion of flows is derived from the growth of residential population and growth in non-residential employees over the DC by-law period from 2011 to 2031.

Given the integrated nature of the respective water and wastewater system in delivering services across the City, it has been determined that a City-wide residential/non-residential (res/non-res) cost share is appropriate.

Utilizing a flow-based calculation is dependent on the water and wastewater design criteria. As such, under this DC update, review of historical design criteria, City standards, Provincial standards, Master Plan criteria and previous criteria utilized under the 2004 and 2009 DC processes was undertaken. In reviewing the criteria, it was noted that there has been a refinement in the baseline projections from using non-residential projections in land area (acres or hectares) as was provided in 2004, to using non-residential projections in employees in the recent data.

On this basis, it was determined that the residential per capita consumption for water and the non-residential per employee consumption for water was generally equal. Similarly, the wastewater flow criterion for residential and non-residential was also determined to be generally equal. With the criteria treated equal, the flow calculation is directly related to and proportional to the population and employee growth.

Since the 2009 DC Background Study, the existing residential population and employees has been updated to reflect current conditions. As such, the res/non-res growth split based on the growth from 2011 to 2031 is as follows:

	Mid 2011	Mid 2031	Growth	Proportion
Residential (persons)	521,348	642,862	121,514	69%
Non Residential (employees)	194,492	249,367	54,875	31%
Total	715,840	892,229	176,389	

3.2.6 Costing Criteria

In addition to updating the water and wastewater project scopes and descriptions, the overall project costs have also been revised from the 2009 DC Update. The linear unit costs for projects from the 2009 DC Update, which were represented in 2008 dollars, have been inflated by an index of 4.5% to represent current (2011) dollars.

Where more up to date cost information was available, such as tender prices or detailed EA project cost estimates, these costs were used instead of the typical unit cost calculation.

4. Service Standards

The following standards are the minimum acceptable level of service for each category of service. The City Standards will be used for the design and construction of all roads and municipal services required for all new development. These standards set the level of service for the community, both for new and existing development (i.e. replacement of existing infrastructure).

4.1 Water Distribution System

The water distribution system shall be designed to deliver all required water supply demands and fire flows (protection) based on MOE and Regional guidelines and in accordance with the Fire Underwriters Survey. The minimum watermain size shall be 150 mm diameter for residential, 300 mm for commercial/institutional/industrial.

The City standards require that the minimum distribution system fire flow pressure be not less than 140 kpa (20 psi), distribution system maximum hour pressure does not fall below 275 kpa (40 psi) and distribution system static pressure does not exceed 700 kpa (100 psi). The water system shall be "looped" to minimize water quality problems.

4.2 Sanitary Sewer System

The sewer system shall be designed to carry flows from the drainage area as specified by the City, which may include the Developer's lands, as well as lands beyond the Developer's properties including existing developed lands (external lands) and future developable lands within the urban boundary.

The minimum sewer size for residential development is 250 mm diameter with a minimum velocity of 0.75 m/s. The design shall conform to Ontario Provincial Standards Specifications. For industrial / commercial / institutional development, the minimum sewer size is 375 mm.

The development projections for new developments were provided by the City of Hamilton Planning Department and are the basis for analysis of the sanitary sewer system. The analysis of sewer systems was completed on the basis of the following criteria:

4.2.1 Sanitary Sewers

- Sewer Capacity - The sewers affected by new development were reviewed to determine their capacity. As-recorded information from the City was used to obtain pipe sizes and grades.
- The following criteria are used to estimate the sewage flows from a new residential development.

Number of People per House	=	3.5
Per Capita Flow	=	360 L/capita/day
Peaking Factor	=	5 (max.), 2.0 (min.)
Infiltration	=	0.2 L/s/ha

- The sewers are designed to flow at a maximum of 75% full.

In addition to using the City of Hamilton's design criteria for sizing sewers in new development areas, the 2006 Water and Wastewater Master Plan Class EA Report identified major trunk sewer projects and upgrades using calibrated wastewater modelling software. A skeletonised model of the existing City of Hamilton wastewater system using DHI's **M**odelling **O**f **U**rban **SE**wers (MOUSE) software was developed and calibrated by AWS Engineers and Planners Corp. This model was ran under future peak wet weather conditions and a 5-year storm event in order to identify major upgrades to the system. The model results identified trunk projects that would be required to service new growth to 2031 in areas such as the AEGD.

4.2.2 Sewage Pumping Stations

Existing sewage pumping station affected by the new development were assessed to determine their available capacities and if upgrades would be required. For lands where gravity flow is not possible, new pumping stations were sized and identified. New pump stations were identified based on topography and availability of grade to connect into an existing or proposed trunk sanitary sewer system. Previous studies as well as the 2006 Water and Wastewater Master Plan Class EA Report identified many of the proposed pumping stations and upgrades.

4.3 Treatment Facilities

Based on growth projections, the flows draining to the respective treatment facilities were evaluated. The wastewater treatment strategy was based on the Water and Wastewater Master Plan.

The Woodward Ave WWTP will require significant upgrades to support the growth related flows and address water quality requirements within the Hamilton Harbour as outlined in Provincial and Hamilton Harbour Remediation Action Plan policies. Since the 2009 DC Background Study, the Woodward Avenue WWTP expansion scope has been confirmed under the completed Class EA and conceptual design.

The Dundas WWTP will continue to operate. The Waterdown WWTP has been decommissioned and converted to a sewage pumping station, which will pump flows through a new forcemain to the existing Borer's Creek Trunk Sewer.

The Woodward Ave WTP will continue to be the water supply source for all existing and future development areas in Hamilton.

5. Project Description

Provided in Attachments A through C are tables listing the projects for each of the growth areas identified in Section 1. The corresponding figures identify the location of the projects listed in the tables. The tables and figures are located as follows:

Attachment A: Water Projects
Attachment B: Wastewater Projects
Attachment C: City-Wide Water/Wastewater Projects

The project list was devised through an extensive review of background information, including the previous Development Charges Background Study (2004 and 2009), the 2006 Water and Wastewater Master Plan Class EA Report and the City's Capital Works Programs. Meetings with key City staff identified additional projects and refined the project lists.

In this section, we have provided some further input on some of the larger projects or projects that may not be clearly identifiable with development.

5.1 Water Distribution System

5.1.1 Waterdown

The majority of the water projects in Waterdown are required to service the UpCountry Estates, North Waterdown and South Waterdown lands. A 300 mm watermain will extend east along Parkside Dr from the existing Pumping Station, then travel south to connect to a new proposed south Waterdown Tower. There is also a new water tower and associated 400mm watermains proposed to service Waterdown north of Parkside Dr.

Refer to Tables E1.1a and E1.1b, as well as Figure E1-1 for location, size and cost of the projects for this area.

5.1.2 Ancaster

A new 500mm-600mm trunk watermain is required on Garner Road from Southcote Rd to Shaver Rd in order to supply the Ancaster Industrial Park area. This area also has several proposed internal watermain projects, most of which are Direct Developer Contribution sized, required to service the development within the Park. There is also a large number of direct developer sized water projects proposed to service the Meadowlands Area in the southeast corner of Ancaster.

Refer to Tables E1.2a and E1.2b, as well as Figure E1-2 for location, size and cost of the projects for this area.

5.1.3 Binbrook

A new trunk feedermain, as well as pumping station upgrades, will be required to service the development needs of Binbrook. A new 400mm trunk feedermain extending along Fletcher Rd and east to Regional Rd No 56, will supply the reservoir and pumping station, which will then pump water through new 400mm watermain projects throughout the Binbrook Growth Area.

Refer to Tables E1.3a and E1.3b, as well as Figure E1-3 for location, size and cost of the projects for this area.

5.1.4 AEGD/Mount Hope

The servicing for the Mount Hope area and specifically the Airport Employment Growth District (AEGD) has been updated since the 2009 DC Background Study. The servicing strategy and local servicing requirements for the AEGD area were confirmed and identified in the 2010 AEGD water and wastewater master servicing plan. Consistent with the 2006 Hamilton Master Plan, parts of the AEGD will be serviced by PD6 with the balanced serviced by PD18.

Refer to Tables E1.4a and E1.4b, as well as Figure E1-4 for location, size and cost of the projects for this area.

5.1.5 Hamilton Mountain

Several 200mm - 400mm watermains are required to service the North Glanbrook Industrial Business Park (NGIBP) in the southeast corner of the Hamilton Mountain Growth Area. Also required is a large feedermain delivering water from Pumping Station H5A (see Stoney Creek Upper) through the Nash Neighbourhood to Mud St and along Mud St and Stone Church Rd to Pumping Station H6B. Other sections of 400mm – 600mm watermains will be required in the growth area of Upper Sherman Ave and Rymal Rd E.

Refer to Tables E1.5a and E1.5b, as well as Figure E1-5 for location, size and cost of the projects for this area.

5.1.6 Stoney Creek Upper

A new strategy for servicing Pressure District 7 in Upper Stoney Creek was developed. This strategy will include upgrades to Pumping Station H5A and a new 1050mm feedermain from H5A through the Nash Neighbourhood to Mud St and along Mud St and Stone Church Rd to H6B, both of which will also benefit the AEGD. Also included in the strategy will be a new 1050mm feedermain to the east, a new elevated storage tank and a new Zone 7 Booster Pumping Station. Other 300mm and 400mm watermain projects are included to service the Nash, Trinity and Karst Neighbourhoods and new ROPA 9 area. Also carried in the DC is a lump sum cost for internal servicing of the urban boundary extension area of Elfrida, the details of which will be confirmed under further studies.

Refer to Tables E1.6a and E1.6b, as well as Figure E1-6 for location, size and cost of the projects for this area.

5.1.7 Stoney Creek Lower

Several 300mm and 400mm watermains are required to provide looping and to service new employment growth areas within Lower Stoney Creek. The majority of these are employment growth areas that lie adjacent to the railway tracks

Refer to Tables E1.7a and E1.7b, as well as Figure E1-7 for location, size and cost of the projects for this area.

5.1.8 Flamborough Excluding Waterdown

The projects identified for Flamborough are based on the growth needs of Carlisle and include storage, water supply capacity and watermains.

Refer to Table E1.8a for location, size and cost of the projects for this area.

5.2 Wastewater System

5.2.1 Waterdown

The major wastewater projects in Waterdown include the conversion of the Waterdown WWTP to a sewage pumping station. Approximately 1,850m of 450mm forcemain will be required to pump the flows from the converted station to the existing Borer's Creek Trunk Sewer. Pumping Station DC014 will require an upgrade in order to meet the firm capacity requirements to service the South Waterdown development. Also required for South Waterdown will be a 450mm - 600mm sewer that will take flows to the upgraded sewage pumping station

Waterdown North will be serviced by three new sewers (450mm-600mm) that will flow south into the existing system to the Borer's Creek Trunk Sewer.

Refer to Tables E2.1a and E2.1b, as well as Figure E2-1 for location, size and cost of the projects for this area.

5.2.2 Ancaster

The main sanitary sewer projects required to service growth in Ancaster consist of a 300mm gravity sewer in the Meadowlands Development Area, a new 39 L/s sewage pumping station (along with decommissioning of the existing Harmony Hall Sewage Pumping Station) to service the Southcote Woodlands, and gravity sewers ranging from 250mm to 600mm in the Ancaster Business Park. There are also other smaller sewer and pumping station projects required for growth in south and west Ancaster.

Refer to Tables E2.2a and E2.2b, as well as Figure E2-2 for location, size and cost of the projects for this area.

5.2.3 Binbrook

In order to service the growth in Binbrook, pumping Station HC058 will require an upgrade and the existing forcemain on Regional Rd 56 must be twinned. Gravity Sewers extending to the west are also required for servicing Binbrook

Refer to Tables E2.3a and E2.3b, as well as Figure E2-3 for location, size and cost of the projects for this area.

5.2.4 AEGD/Mount Hope

The servicing for the Mount Hope area and specifically the Airport Employment Growth District (AEGD) has been updated since the 2009 DC Background Study. The servicing strategy and local servicing requirements for the AEGD area were confirmed and identified in the 2010 AEGD water and wastewater master servicing plan. Parts of the AEGD will be serviced through connection to existing trunk sewers with available capacity. The balance of the future development area will convey flows to the proposed Dickenson trunk sewer and ultimately the Centennial trunk sewer.

Refer to Tables E2.4a and E2.4b, as well as Figure E2-4 for location, size and cost of the projects for this area.

5.2.5 Hamilton Mountain

The main projects required for servicing the Hamilton Mountain growth area are the gravity sewers that service the NGIBP. This area will require nine gravity sewers ranging from 375mm to 600mm, which will flow to the north to the existing network. The Upper Centennial/Dickenson Trunk Sewer Projects lie within the geographic area of the Hamilton Mountain; however, this infrastructure services the AEGD. The required projects will be a 900mm sewer on Dickenson Rd E coming from Upper James St and the AEGD which will drain to a new Sewage Pumping Station east of Miles Rd. Flows from this pumping station will be pumped through a new 600mm forcemain ending at Trinity Church Rd south of Golf Club Rd. The forcemain will empty into another 900mm trunk sewer which continues east and connects to the Upper Centennial Trunk Sewer on Regional Rd 56.

Refer to Tables E2.5a and E2.5b, as well as Figure E2-5 for location, size and cost of the projects for this area.

5.2.6 Stoney Creek Upper

The main project proposed for Upper Stoney Creek is the Upper Centennial Trunk Sewer, which will be a 1200mm gravity sewer on Regional Rd 56 and Upper Centennial Pkwy from Golf Club Rd to King St.
The ROPA 9 area of Upper Stoney Creek will be serviced by one 675mm gravity sewer flowing to the west and a 450mm and 600mm gravity sewer flowing to the east. The Nash Neighbourhood growth area will be serviced internally by direct developer sized sewers which will flow to the Upper Centennial Trunk Sewer. The Karst and Trinity Neighbourhoods will also require servicing by new gravity sewers.

Refer to Tables E2.6a and E2.6b, as well as Figure E2-6 for location, size and cost of the projects for this area.

5.2.7 Stoney Creek Lower

A new sewage pumping station, forcemain and gravity sewer will be required to service the areas surrounding Fifty Rd South of the QEW. Green Rd Pumping Station upgrades will be required as well as Direct Developer sized gravity sewers throughout the employment areas surrounding the railway.

Refer to Tables E2.7a and E2.7b, as well as Figure E2-7 for location, size and cost of the projects for this area.

5.2.8 Flamborough Excluding Waterdown

No sanitary works are expected in this area.

5.3 City-Wide Water/Wastewater Projects

City-Wide water and wastewater projects cover traditional water and wastewater infrastructure capital works (pumping stations, watermains, sewers, etc) throughout the City, most of which are required to support growth, however, do not lie within the geographical areas of the other systems mentioned above. Also covered in City-Wide projects are items such as studies, flow monitoring and intensification upgrades.

In addition to projects being identified for servicing new developments, several major projects from the 2006 Water and Wastewater Master Plan Class EA Report were carried forward into the DC By-Law update. These are large, trunk infrastructure projects and are required to service new growth areas.

Projects in this section relate to City-wide programs identified to increase available capacity in the system. This will allow development to continue in the City while maintaining water quality targets. Without these improvements, development freezes could take effect.

Refer to Table E3a and E3b for location, size and cost of the City Wide projects.

5.4 Woodward Avenue WWTP

5.4.1 Project Scope

As part of the 2011 City of Hamilton Development Charges Update and review of the water and wastewater capital program, it is recognized that the major capital project required to meet the future growth to 2031 is the Woodward Ave. WWTP expansion.

The scope of the Woodward Ave WWTP expansion has evolved from the project developed under the Master Plan and carried in the last DC update. The project has undergone review through the Class EA study as well as conceptual/preliminary design. Details related to the evaluation of design concepts and selection of the preferred scope for the Woodward Ave WWTP should be referenced from the Environmental Study Report (ESR) for Wastewater Treatment and CSO Control in the Woodward Ave. WWTP Service Area, dated March 2008. The design concept was further refined under the Enhanced Conceptual Design in November 2008 and ultimately confirmed through value engineering and financial sustainability planning in fall 2010.

The approach for expansion is based on key design objectives of providing not only additional hydraulic treatment capacity but also providing new enhanced treatment to address water quality requirements and more stringent effluent criteria. Considering these design objectives through review of the site limitations and available treatment technologies, it was determined that membrane technology was required to satisfy these requirements.

The total project scope includes:

- upgrades to the raw water pumping station to increase capacity from existing 1330 MLD to 1700 MLD
- provision of a new membrane treatment plant complete with electrical upgrades
    - phase 1 is to provide capacity expansion and meet water quality objectives from the existing rated capacity of 409 MLD to 450 MLD
    - phase 2 is to provide capacity expansion and meet water quality objectives from 450 MLD to 500 MLD
- additional CCT and outfall upgrades as well as the corresponding upgrades to the Red Hill Creek to address the additional capacity of the plant

This scope of expansion at the Woodward Ave WWTP will ultimately provide 500 MLD average day flow capacity with a peak capacity of 1,000 MLD. The upgraded level of treatment will address tertiary phosphorus and suspended solids removal (RAP), year round ammonia removal (RAP) and year round non-toxic disinfection of plant effluent (CEPA). The new outfall will be dedicated to treatment plant effluent. The overall strategy is also based on maximizing all wet weather treatment at the Woodward Ave. WWTP and hydraulically managing the remaining wet weather flow in the Hamilton collection system through real time control (RTC) in order to meet the MOE policy F-5-5.

This strategy will ultimately meet the following plant discharge design criteria:

Parameter	Woodward Avenue WWTP Performance Objectives (at 500 ML/d)		RAP Final Loading Targets for Woodward Avenue WWTP
	Concentration	Corresponding Loading	
Total suspended solids (TSS)	3 mg/L	1,488 kg/d	900 kg/d
Total phosphorus	0.15 mg/L	74 kg/d	60 kg/d
Ammonia-N	2 mg/L (May to November) 5 mg/L (December to April)	1,000 kg/d	530 kg/d
Biochemical oxygen demand (BOD5)	5 mg/L	2,500 kg/d	No target

As part of the 2011 Water, Wastewater and Storm Rate Budget process, City staff undertook a review of the Woodward Ave. WWTP historical recorded flows as well as recent development approvals and pending development approvals to determine potential for phasing opportunities. It was identified that, based on current flows to the plant and current trends in the City's economic development plan, there was opportunity to phase the expansion of the plant which would provide a more financially sustainable capital expenditure forecast for the delivery of the overall expansion project . As noted, this phasing has resulted in completing components of the Phase 1 expansion up to 450 MLD over the next five (5) years, and deferring the Phase 2 expansion to 500 MLD to beyond 2021.

Attachment D provides additional detail on the Woodward Ave WWTP project costs. A capital project sheet is provided demonstrating the phasing of the project expenditures. A further capital cost summary table is provided to demonstrate and compare the evolution of the project scope and costs as well as to demonstrate the application of the project funding grants.

5.4.2 Project Cost Sharing

The fundamentals of cost sharing the Woodward Ave WWTP between growth (DC eligible) and existing users (Benefit to Existing) was established through the 2009 DC Update. The technical memoranda are provided in Attachment D.

The cost sharing concept remains valid and is based on recognition that the City would have needed to upgrade the facility to meet more stringent effluent criteria regardless of growth. However, it is recognized that growth has triggered the need to expand the plant ultimately to 500 MLD and that this expansion requires implementation of membrane treatment to work within the site space constraints.

The total project requirements to satisfy meeting the 2031 growth requirements as well as phasing construction costs are based on constructing upgrades to 450 MLD in the short term and expanding the plant to 500 MLD in the future. It is recognized that this approach has needs with respect to providing higher level of treatment for the existing rated capacity of 409 MLD, to providing capacity and higher level of treatment for Phase 1 to 450 MLD, and to providing capacity and higher level of treatment for Phase 2 to 500 MLD. However, there are shared costs between existing needs and growth needs throughout the project. Under this assignment, review of the existing cost sharing rationales and a high level check of alternative cost sharing approaches was undertaken which confirmed that the current cost sharing split remains reasonable and fair. As such the total project costs are split:

Growth (DC Eligible)	49%
Existing Users (Benefit to Existing)	51%

A substantial benefit to the overall project cost is the application of environmental, provincial and federal grants. At the time of the 2009 DC Update, the status of the grants and the eligibility of the grants related to growth and non-growth needs was not confirmed. Given that the timing and approach of the Woodward Ave WWTP project has changed, there is potential risk to the full application of the grants due to time limitations and timing of project components. As such the Woodward Ave WWTP program is reflecting only known and committed funding agreements and criteria. However, it is proposed that the project grants be shared across the full project costs at the growth/non-growth share of 49%/51% respectively.

The Woodward Ave WWTP project costs, demonstrating the project scope and cost estimate evolution and demonstrating the application of the committed grants, are presented in Attachment D.

6. Summary of Development Charges Projects

As noted, the details of the full infrastructure program are provided in the Attachments. The following tables provide a summary of this information.

Table E 1 Summary of Linear Infrastructure Costs (Total - $2011)

Total Costs

Area	Sanitary	Water	Total
Ancaster	$ 4,322,000	$ 15,308,000	$ 19,630,000
Waterdown	$ 10,998,000	$ 33,101,000	$ 44,099,000
Binbrook	$ 8,343,000	$ 12,907,000	$ 21,250,000
AEGD/Mt. Hope	$ 33,258,000	$ 13,728,000	$ 46,986,000
Hamilton Mountain	$ 47,253,983	$ 26,470,389	$ 73,724,372
Stoney Creek Upper	$ 124,819,000	$ 106,095,000	$ 230,914,000
Stoney Creek Lower	$ 21,700,592	$ 11,659,000	$ 33,359,592
Flamborough excluding Waterdown	$ -	$ 3,405,000	$ 3,405,000
City Wide Projects	$ 51,988,242	$ 49,365,807	$ 101,354,048
Total ($2011)	**$ 302,682,817**	**$ 272,039,196**	**$ 574,722,012**

Non-Growth Related Costs (City Costs)

Area	Sanitary	Water	Total
Ancaster	$ 106,000	$ 3,712,000	$ 3,818,000
Waterdown	$ 8,654,000	$ 4,171,000	$ 12,825,000
Binbrook	$ -	$ -	$ -
AEGD/Mt. Hope	$ -	$ -	$ -
Hamilton Mountain	$ -	$ 217,000	$ 217,000
Stoney Creek Upper	$ -	$ 1,596,000	$ 1,596,000
Stoney Creek Lower	$ -	$ -	$ -
Flamborough excluding Waterdown	$ -	$ -	$ -
City Wide Projects	$ 7,706,875	$ 7,395,535	$ 15,102,410
Total ($2011)	**$ 16,466,875**	**$ 17,091,535**	**$ 33,558,410**

Growth Related Costs - Development Charges

Area	Sanitary	Water	Total
Ancaster	$ 3,225,000	$ 11,596,000	$ 14,821,000
Waterdown	$ 1,535,000	$ 26,528,500	$ 28,063,500
Binbrook	$ 7,845,000	$ 10,565,000	$ 18,410,000
AEGD/Mt. Hope	$ 28,353,500	$ 11,554,000	$ 39,907,500
Hamilton Mountain	$ 46,454,483	$ 18,507,313	$ 64,961,796
Stoney Creek Upper	$ 117,015,000	$ 94,207,000	$ 211,222,000
Stoney Creek Lower	$ 20,496,155	$ 10,793,000	$ 31,289,155
Flamborough excluding Waterdown	$ -	$ 2,813,000	$ 2,813,000
City Wide Projects	$ 44,281,367	$ 41,970,271	$ 86,251,638
Total ($2011)	**$ 269,205,505**	**$ 228,534,084**	**$ 497,739,589**

Direct Developer's Costs

Area	Sanitary	Water	Total
Ancaster	$ 756,000	$ -	$ 756,000
Waterdown	$ 809,000	$ 2,401,500	$ 3,210,500
Binbrook	$ 498,000	$ 2,342,000	$ 2,840,000
AEGD/Mt. Hope	$ 4,904,500	$ 1,721,000	$ 6,625,500
Hamilton Mountain	$ 799,500	$ 7,746,076	$ 8,545,576
Stoney Creek Upper	$ 7,804,000	$ 10,292,000	$ 18,096,000
Stoney Creek Lower	$ 1,204,437	$ 866,000	$ 2,070,437
Flamborough excluding Waterdown	$ -	$ 592,000	$ 592,000
City Wide Projects	$ -	$ -	$ -
Total ($2011)	**$ 16,775,437**	**$ 25,960,576**	**$ 42,736,013**

Post Period Benefit Costs

Area	Sanitary	Water	Total
Ancaster	$ 235,000	$ -	$ 235,000
Waterdown	$ -	$ -	$ -
Binbrook	$ -	$ -	$ -
AEGD/Mt. Hope	$ -	$ 453,000	$ 453,000
Hamilton Mountain	$ -	$ -	$ -
Stoney Creek Upper	$ -	$ -	$ -
Stoney Creek Lower	$ -	$ -	$ -
Flamborough excluding Waterdown	$ -	$ -	$ -
City Wide Projects	$ -	$ -	$ -
Total ($2011)	**$ 235,000**	**$ 453,000**	**$ 688,000**

Note: Woodward WTP and WWTP not included in Linear Infrastructure Costs

ATTACHMENT A

WATER PROJECTS

Table E1.1a Waterdown Water Distribution System Development Charges Works (Planning Period - 0 to 5 Years)

Project ID	Project/Street	From	To	Length (m)	Size (mm)	Estimated Total Cost ($2011)	Benefit to Existing	Oversizing	Direct Developer Contribution ($2011)	Development Charges ($2011)	Post Period Benefit ($2011)	Benefit to Existing ($2011)	Amount already funded from DC Reserve	City of Hamilton Timing Estimate	Updated Budget Cost/ Actual	Engineering Benchmarks Adjustments	Scope Change	Project Added
W1-W-09	Waterdown North Tower	North of Parkside Dr, west of Centre Rd			8.25 ML	$9,955,000			$0	$9,955,000	$0	$0	$3,258,000	Tower Constructed		X		
W2-W-09	Waterdown North	Parkside Dr.	Parkside Dr.	3000	400	$2,489,000			$1,493,000	$996,000	$0	$0	$498,000	0-5 - Partially Complete		X		
W7-W-09	New Pressure District South Water Tower	South of Hwy 5 between Evans Rd and Pamela St			6.3 ML	$5,321,000	16%		$0	$4,470,000	$0	$851,000		0-5		X		
W8-W-09	Waterdown South	Hwy 5	New Tower	1575	400	$1,306,000			$784,000	$522,000	$0	$0		0-5		X	X	
W13-W-09	Up Country Estates - Parkside Dr	200 m east of Robson Rd	400 m east of Robson Rd	200	300	$100,000			$50,000	$50,000	$0	$0		0-5		X		
Total Waterdown (0 to 5 Years)						**$19,171,000**			**$2,327,000**	**$15,993,000**	**$0**	**$851,000**	**$3,756,000**					

Table E1.1b Waterdown Water Distribution System Development Charges Works (Planning Period - 6 Years to UBBO)

Project ID	Project/Street	From	To	Length (m)	Size (mm)	Estimated Total Cost ($2011)	Benefit to Existing	Oversizing	Direct Developer Contribution ($2011)	Development Charges ($2011)	Post Period Benefit ($2011)	Benefit to Existing ($2011)	Amount already funded from DC Reserve	City of Hamilton Timing Estimate	Updated Budget Cost/ Actual	Engineering Benchmarks Adjustments	Scope Change	Project Added
W6-W-09	HD016 Booster Station Upgrade and Back Up Power	208l/s	309l/s		4 x 103L/S	$7,094,000	10%		$0	$6,385,000	$0	$709,000		6-10		X		
W10-W-09	PD16 Feedermain - Valley Rd and Rock Chapel Rd	PS HD016	Dundas St/Algonquin Ave	3900	600	$10,443,000	25%		$0	$7,832,000	$0	$2,611,000		10+		X	X	
W11-W-09	Up Country Estates - Dundas St	550 m west of Evans Ave	250 m west of Evans Ave	300	300	$149,000			$74,500	$74,500	$0	$0		6-10		X		
Total Waterdown (6 Years to UBBO)						**$17,686,000**			**$74,500**	**$14,291,500**	**$0**	**$3,320,000**						

Table E1.2a Ancaster Water Distribution System Development Charges Works (Planning Period - 0 to 5 Years)

Project ID	Project/Street	From	To	Length (m)	Size (mm)	Estimated Total Cost ($2011)	Benefit to Existing	Oversizing	Direct Developer Contribution ($2011)	Development Charges ($2011)	Post Period Benefit ($2011)	Benefit to Existing ($2011)	Amount already funded from DC Reserve	City of Hamilton Timing Estimate	Updated Budget Cost/ Actual	Engineering Benchmarks Adjustments	Scope Change	Project Added
A1-W-09	Garner Rd.	Southcote Rd.	Fiddlers Green Rd.	2060	600	$3,931,000			$0	$3,931,000	$0	$0		0-5		X		
A4-W-09	Ancaster Industrial Park - South Connection	McClure Rd Extension WM	Cormorant Dr. (via Hydro Easement)	825	300	$411,000			$0	$411,000	$0	$0		0-5		X		
A16-W-09	Garner Rd.	Fiddlers Green Rd.	Hamilton Dr.	1680	500	$2,579,000			$0	$2,579,000	$0	$0		0-5		X		
A17-W-09	Garner Rd.	Hamilton Dr.	Shaver Rd.	850	500	$1,305,000			$0	$1,305,000	$0	$0		0-5		X		
A18-W-09	Reservoir W-H 18 (additional elevated storage) AEGD Proj B-20	North of Wilson St W			7 ML	$6,267,000	50%		$0	$3,133,000	$0	$3,134,000		0-5		X		
A20-W-09	Meadowlands Neighbourhood - Springbrook Ave	Connection of East and West 300 mm watermains		90	300	$45,000			$0	$45,000	$0	$0		0-5		X		
Total Ancaster (0 to 5 Years)						**$14,538,000**			**$0**	**$11,404,000**	**$0**	**$3,134,000**	**$0**					

Table E1.2b Ancaster Water Distribution System Development Charges Works (Planning Period - 6 Years to UBBO)

Project ID	Project/Street	From	To	Length (m)	Size (mm)	Estimated Total Cost ($2011)	Benefit to Existing	Oversizing	Direct Developer Contribution ($2011)	Development Charges ($2011)	Post Period Benefit ($2011)	Benefit to Existing ($2011)	Amount already funded from DC Reserve	City of Hamilton Timing Estimate	Updated Budget Cost/ Actual	Engineering Benchmarks Adjustments	Scope Change	Project Added
A2-W-09	Shaver Rd.	Connect existing pipes/crossing of 403	Westview Ave.	800	300	$770,000	75%		$0	$192,000	$0	$578,000		6-10		X		
Total Ancaster (6 Years to UBBO)						**$770,000**			**$0**	**$192,000**	**$0**	**$578,000**						

Table E1.3a Binbrook Water Distribution System Development Charges Works (Planning Period - 0 to 5 Years)

Project ID	Project/Street	From	To	Length (m)	Size (mm)	Estimated Total Cost ($2011)	Benefit to Existing	Oversizing	Direct Developer Contribution ($2011)	Development Charges ($2011)	Post Period Benefit ($2011)	Benefit to Existing ($2011)	Amount already funded from DC Reserve	City of Hamilton Timing Estimate	Updated Budget Cost/ Actual	Engineering Benchmarks Adjustments	Scope Change	Project Added
B1-W-09	Regional Rd. 56	Binbrook Rd.	Viking Dr	280	400	$384,000			$269,000	$115,000	$0	$0		0-5		X		
B2-W-09	HD 019 Pumping Station Expansion	Regional Rd. 56				$1,939,000			$0	$1,939,000	$0	$0		0-5		X		
B4-W-09	Future Binbrook Road	Regional Rd. 56	1800 m west	1800	400	$1,494,000			$896,000	$598,000	$0	$0	$299,000	0-5 - Partially Complete		X		
B6-W-09	Binbrook Rd.	Existing elevated tank	250 m east of Fletcher Rd.	1000	400	$830,000			$0	$830,000	$0	$0		0-5		X		
B7-W-09	Binbrook Trunk Feedermain	ROPA 9 Area WM	Existing HD019 Reservoir and PS	7200	400	$5,974,000			$0	$5,974,000	$0	$0		0-5	X	X		
B9-W-09	Southwest Binbrook	B8-W-09	975 m east	975	400	$809,000			$485,000	$324,000	$0	$0		0-5		X		
B10-W-11	Orlick (Southwest Dickenson & Hwy 6)	Dickenson	340 m south	340	400	$283,000			$169,000	$114,000	$0	$0		0-5				X
Total Binbrook (0 to 5 Years)						**$11,713,000**			**$1,819,000**	**$9,894,000**	**$0**	**$0**	**$299,000**					

Table E1.3b Binbrook Water Distribution System Development Charges Works (Planning Period - 6 Years to UBBO)

Project ID	Project/Street	From	To	Length (m)	Size (mm)	Estimated Total Cost ($2011)	Benefit to Existing	Oversizing	Direct Developer Contribution ($2011)	Development Charges ($2011)	Post Period Benefit ($2011)	Benefit to Existing ($2011)	Amount already funded from DC Reserve	City of Hamilton Timing Estimate	Updated Budget Cost/ Actual	Engineering Benchmarks Adjustments	Scope Change	Project Added
B3-W-09	Regional Rd. 56	Pumping Station	750 m south	750	400	$623,000			$0	$623,000	$0	$0		6-10		X		
B5-W-09	Future Binbrook Road	Binbrook Rd., 200 m east of Fletcher Rd	400 m north	400	400	$331,000			$199,000	$132,000	$0	$0		6-10		X		
B8-W-09	Southwest Binbrook	Binbrook Rd	650 m south	650	400	$539,000			$324,000	$215,000	$0	$0		6-10		X		
Total Binbrook (6 Years to UBBO)						**$1,493,000**			**$523,000**	**$970,000**	**$0**	**$0**	**$0**					

Table E1.4a AEGD/Mount Hope Water Distribution System Development Charges Works (Planning Period - 0 to 5 Years)

Project ID	Project/Street	From	To	Length (m)	Size (mm)	Estimated Total Cost ($2011)	Benefit to Existing	Oversizing	Direct Developer Contribution ($2011)	Development Charges ($2011)	Post Period Benefit ($2011)	Benefit to Existing ($2011)	Amount already funded from DC Reserve	City of Hamilton Timing Estimate	Updated Budget Cost/ Actual	Engineering Benchmarks Adjustments	Scope Change	Project Added
MH4-W-11	AEGD Project B-13 - Zone 6 Watermain on new road	Provident Rd	856 m northwest	856	300	$426,000				$426,000				0-5			X	X
MH5-W-11	AEGD Project B-15 - Zone 18 Watermain on Southcote Rd	Garner Rd	383 m South	383	400	$318,000				$318,000				0-5			X	X
MH31-W-11	Orlick (Southwest Dickenson & Hwy 6)	Dickenson	340 m south	340	400	$283,000			$169,000	$114,000				0-5			X	X
Total Mount Hope (0 to 5 Years)						**$1,027,000**	**$0**	**$0**	**$169,000**	**$858,000**	**$0**	**$0**						

Table E1.4b AEGD/Mount Hope Water Distribution System Development Charges Works (Planning Period - 6 Years to UBBO)

Project ID	Project/Street	From	To	Length (m)	Size (mm)	Estimated Total Cost ($2011)	Benefit to Existing	Oversizing	Direct Developer Contribution ($2011)	Development Charges ($2011)	Post Period Benefit ($2011)	Benefit to Existing ($2011)	Amount already funded from DC Reserve	City of Hamilton Timing Estimate	Updated Budget Cost/ Actual	Engineering Benchmarks Adjustments	Scope Change	Project Added
MH1-W-11	AEGD Project B-1 - Zone 18 Watermain on Smith Rd	Garner Rd	389 m south	389	300	$194,000				$194,000				6-10			X	X
MH2-W-11	AEGD Project B-2 - Zone 18 Watermain on new road	Southcote Rd	Smith Rd	417	400	$346,000			$208,000	$138,000				6-10			X	X
MH3-W-11	AEGD Project B-3 - Zone 18 Watermain on Southcote Rd	New road	Hydro Corridor	700	400	$581,000				$581,000				6-10			X	X
MH7-W-11	AEGD Project B-21 - Zone 6 Watermain on Book Rd	372 m east of Smith Rd	Smith Rd	372	400	$309,000				$185,000	$124,000			10+			X	X
MH8-W-11	AEGD Project B-22 - Zone 18 Watermain on Southcote Rd	Book Rd	590 m north	590	300	$294,000				$294,000				10+			X	X
MH9-W-11	AEGD Project B-23 - Zone 18 Watermain on Smith Rd	Book Rd	603 m north	603	300	$300,000				$300,000				10+			X	X
MH10-W-11	AEGD Project B-26 - Zone 18 Watermain on new road	Smith Rd	421 m east	421	400	$349,000			$210,000	$139,000				10+			X	X
MH11-W-11	AEGD Project B-29 - Zone 6 Watermain on Rymal Rd and Glancaster Rd	Garth St	Twenty Rd	2559	400	$2,123,000				$2,123,000				10+			X	X
MH12-W-11	AEGD Project B-30 - Zone 18 Watermain on Garner Rd and Glancaster Rd	HD018	New Road	568	400	$471,000			$283,000	$188,000				10+			X	X
MH13-W-11	AEGD Project B-31 - Zone 18 Watermain on new road	Raymond Rd Extension	863 m west	863	400	$716,000			$430,000	$286,000				10+			X	X
MH14-W-11	AEGD Project B-32 - Zone 18 Watermain on new road	Raymond Rd Extension	552 m east	552	400	$458,000			$275,000	$183,000				10+			X	X
MH15-W-11	AEGD Project B-33 - Zone 6 Watermain on Dickenson Rd	Garth St Extension	953 m west	953	300	$475,000				$475,000				10+			X	X
MH16-W-11	AEGD Project B-34 - Zone 18 Watermain on Southcote Rd	Hydro Corridor	293 m south	293	400	$243,000			$146,000	$97,000				10+			X	X
MH17-W-11	AEGD Project B-39 - Zone 6 Watermain on Smith Rd	Book Rd	259 m south	259	300	$129,000				$129,000				10+			X	X
MH18-W-11	AEGD Project B-41 - Zone 18 Watermain on Smith Rd	Hydro Corridor	627 m north	627	300	$313,000				$313,000				10+			X	X
MH19-W-11	AEGD Project B-42 - Zone 18 Watermain on Smith Rd	Hydro Corridor	350 m south	350	300	$174,000				$174,000				10+			X	X
MH20-W-11	AEGD Project B-49 - Zone 6 Watermain on White Church Rd	Hampton Brook Way	886 m west	886	300	$441,000				$441,000				10+			X	X
MH21-W-11	AEGD Project B-50 - Zone 6 Watermain on White Church Rd	MH20-W-11	687 m west	687	300	$343,000				$343,000				10+			X	X
MH22-W-11	AEGD Project B-51 - Zone 6 Watermain on Book Rd	Glancaster Rd	595 m west	595	400	$494,000				$296,000	$198,000			10+			X	X
MH23-W-11	AEGD Project B-52 - Zone 6 Watermain on Dickenson Rd	Glancaster Rd	598 m east	598	300	$298,000				$298,000				10+			X	X
MH24-W-11	AEGD Project B-55 - Zone 6 Watermain on new Garth St Extension	Dickenson Rd	837 m north	837	400	$695,000				$695,000				10+			X	X
MH25-W-11	AEGD Project B-58 - Zone 6 Watermain on Dickenson Rd	Garth St	870 m east	870	300	$433,000				$433,000				10+			X	X
MH26-W-11	AEGD Project B-61 - Zone 6 Watermain on new Garth St Extension	Glancaster Rd	1181 m east	1181	400	$980,000				$980,000				10+			X	X
MH27-W-11	AEGD Project B-62 - Zone 6 Watermain on new Garth St Extension	Dickenson Rd	607 m south	607	400	$504,000				$504,000				10+			X	X
MH28-W-11	AEGD Project B-63 - Zone 6 Watermain on Smith Rd	259 m south of Book Rd	581 m south of Book Rd	322	300	$160,000				$160,000				10+			X	X
MH29-W-11	AEGD Project B-68 - Zone 6 Watermain on new Garth St Extension	Twenty Rd	662 m south	662	400	$549,000				$549,000				10+			X	X
MH30-W-11	AEGD Project B-69 - Zone 6 Watermain on Book Rd	Smith Rd	Southcote Rd	397	400	$329,000				$198,000	$131,000			10+			X	X
Total Mount Hope (6 Years to UBBO)						**$12,701,000**			**$1,552,000**	**$10,696,000**	**$453,000**	**$0**						

Table E1.5a Hamilton Mountain Water Distribution System Development Charges Works (Planning Period - 0 to 5 Years)

Project ID	Project/Street	From	To	Length (m)	Size (mm)	Estimated Total Cost ($2011)	Benefit to Existing	Oversizing	Direct Developer Contribution ($2011)	Development Charges ($2011)	Post Period Benefit ($2011)	Benefit to Existing ($2011)	Amount already funded from DC Reserve	City of Hamilton Timing Estimate	Updated Budget Cost/ Actual	Engineering Benchmarks Adjustments	Scope Change	Project Added
HM2-W-09	Terni Blvd./Cadham Blvd.	125m West of Upper Gage Ave.	Miles Rd.	370	400	$308,000			$184,000	$124,000	$0	$0		0-5		X		
HM9-W-09	Twenty Rd. Re-alignment	Glover Rd.	Dartnall Rd. Extension	680	400	$564,000			$338,000	$226,000	$0	$0		0-5		X		
HM10-W-09	Twenty Rd.	Dartnall Rd. Extension	Nebo Rd.	645	400	$452,284			$321,076	$131,208	$0	$0		constructed - PW-10-39	X		X	
HM11-W-09	Twenty Rd.	Nebo Rd.	900m west of Nebo Rd.	900	300	$866,000	25%		$0	$649,000	$0	$217,000		0-5		X		
HM12-W-09	Nebo Rd.	Twenty Rd.	Dickenson Rd.	1350	400	$1,848,000			$0	$1,848,000	$0	$0		0-5		X		
HM14-W-09	Nebo Rd.	Rymal Rd. East	Twenty Rd.	1300	400	$1,073,105			$0	$1,073,105	$0	$0		constucted - PW-10-13	X			
HM15-W-09	Dartnall Rd.	Dead End	Dickenson Rd.	2100	400	$1,743,000			$0	$1,743,000	$0	$0		Dead end to Twenty - constructed PW-10-39;		X		
HM17-W-09	Upper Wellington	Stone Church Rd.	Como Pl	200	300	$331,000			$0	$331,000	$0	$0		constructed - PW-10-34 (Stone Church to Como, not Dragoon)		X		
HM24-W-09	Stone Church Rd	Trinity Church Rd Extension	Pritchard Rd	300	400	$249,000			$149,000	$100,000	$0	$0		0-5		X		
HM25-W-11	Connection from Adam Estates to Upper James St			180	200	$136,000			$0	$136,000	$0	$0		0-5				X
Total Hamilton Mountain (0 to 5 Years)						**$7,570,389**			**$992,076**	**$6,361,313**	**$0**	**$217,000**						

Table E1.5b Hamilton Mountain Water Distribution System Development Charges Works (Planning Period - 6 Years to UBBO)

Project ID	Project/Street	From	To	Length (m)	Size (mm)	Estimated Total Cost ($2011)	Benefit to Existing	Oversizing	Direct Developer Contribution ($2011)	Development Charges ($2011)	Post Period Benefit ($2011)	Benefit to Existing ($2011)	Amount already funded from DC Reserve	City of Hamilton Timing Estimate	Updated Budget Cost/ Actual	Engineering Benchmarks Adjustments	Scope Change	Project Added
HM1-W-09	Crerar Dr.	160m North of Stone Church Rd.	Stone Church Rd.	160	400	$133,000			$80,000	$53,000	$0	$0		6-10		X		
HM3-W-09	Extension of Terni Blvd.	Miles Rd.	300m west	300	400	$249,000			$149,000	$100,000	$0	$0		6-10		X		
HM4-W-09	Miles Rd.	West extension of Terni Blvd.	East extension of Terni Blvd.	50	400	$69,000			$0	$69,000	$0	$0		6-10		X		
HM5-W-09	Vineberg Dr.	140m east of Upper Wentworth St.	590m east of Upper Wentworth St.	450	400	$374,000			$224,000	$150,000	$0	$0		6-10		X		
HM8-W-09	Twenty Rd. Extension	Glover Rd.	Trinity Church Rd.	580	400	$481,000			$289,000	$192,000	$0	$0		6-10		X		
HM13-W-09	Dickenson Rd.	Nebo Rd.	800m east of Nebo Rd.	800	200	$604,000			$0	$604,000	$0	$0		10+		X		
HM18-W-09	Extension of Terni Blvd.	590m east of Upper Wentworth St.	300m west of Miles Rd.	450	400	$374,000			$224,000	$150,000	$0	$0		6-10		X		
HM20-W-09	Stone Church Trunk Feedermain	Isaac Brock Dr	HD06B	4849	1050	$14,442,000			$4,667,000	$9,775,000	$0	$0		6-10		X		
HM21-W-09	East-West leg of Acadia Dr.	Upper Sherman Ave.	North-South leg Acadia Dr.	320	400	$265,000			$159,000	$106,000	$0	$0		6-10		X		
HM6-W-09	Shermal Estates	Stone Church Rd.	Rymal Rd. East	1000	600	$1,909,000			$962,000	$947,000	$0	$0		6-10 (change project description - Upper Sherman)		X		
Total Hamilton Mountain (6 Years to UBBO)						**$18,900,000**			**$6,754,000**	**$12,146,000**	**$0**	**$0**						

Table E1.6a Stoney Creek Upper Water Distribution System Development Charges Works (Planning Period - 0 to 5 Years)

Project ID	Project/Street	From	To	Length (m)	Size (mm)	Estimated Total Cost ($2011)	Benefit to Existing	Oversizing	Direct Developer Contribution ($2011)	Development Charges ($2011)	Post Period Benefit ($2011)	Benefit to Existing ($2011)	Amount already funded from DC Reserve	City of Hamilton Timing Estimate	Updated Budget Cost/ Actual	Engineering Benchmarks Adjustments	Scope Change	Project Added
SCU4-W-09	Green Mountain Rd.	Isaac Brock Dr.	First Rd. W	750	400	$623,000			$373,000	$250,000	$0	$0		0-5		X		
SCU6-W-09	Nash Planning Neighborhood	North Extension of Isaac Brock Dr.	First Rd. W	850	400	$705,000			$423,000	$282,000	$0	$0		0-5		X		
SCU7-W-09	Reservoir W-H7 (additional storage)				5.5 ML 5,500 m^3	$9,695,000			$0	$9,695,000	$0	$0		0-5		X		
SCU8-W-09	P.S. W-H7(replace existing pumps)				3 x 226L/S	$8,158,000			$0	$8,158,000	$0	$0		0-5		X		
SCU9-W-09	Green Mountain Rd.	First Rd W	Centennial Pkwy	800	400	$664,000			$398,000	$266,000	$0	$0		0-5		X		
SCU10-W-09	Mud St. W	First Rd W	Isaac Brock Dr	800	400	$664,000			$398,000	$266,000	$0	$0		0-5		X		
SCU11-W-09	Centennial Pkwy Trunk Feedermain	Barton St.	HD05A	3500	1200	$16,407,000			$0	$16,407,000	$0	$0		0-5		X		
SCU12-W-09	Centennial Pkwy Trunk Feedermain - Glover Mtn Rd	HD05A	Mud St. W	2534	1200	$12,612,000			$0	$12,612,000	$0	$0		0-5		X	X	
SCU16-W-09	Upper Mount Albion Rd. Extension	235 m south of Highland Rd W	Highland Rd W	235	300	$226,000			$0	$226,000	$0	$0		0-5		X		
Total Stoney Creek Upper (0 to 5 Years)						**$49,754,000**			**$1,592,000**	**$48,162,000**	**$0**	**$0**	**$0**					

Table E1.6b Stoney Creek Upper Water Distribution System Development Charges Works (Planning Period - 6 Years to UBBO)

Project ID	Project/Street	From	To	Length (m)	Size (mm)	Estimated Total Cost ($2011)	Benefit to Existing	Oversizing	Direct Developer Contribution ($2011)	Development Charges ($2011)	Post Period Benefit ($2011)	Benefit to Existing ($2011)	Amount already funded from DC Reserve	City of Hamilton Timing Estimate	Updated Budget Cost/ Actual	Engineering Benchmarks Adjustments	Scope Change	Project Added
SCU14-W-09	Heritage Green - New Alignment to be determined	Highland Rd.	Rymal Rd	900	400	$746,000			$448,000	$298,000	$0	$0		6-10		X		
SCU15-W-09	Heritage Green	200m north of Rymal Rd	300 m west of 2nd Rd W	900	400	$746,000			$448,000	$298,000	$0	$0		6-10		X		
SCU17-W-09	Elfrida Distribution Network					$23,647,000			$7,804,000	$15,843,000	$0	$0		10+		X		
SCU18-W-09	P.S. W-H5A Upgrades					$5,912,000	27%		$0	$4,316,000	$0	$1,596,000		6-10		X		
SCU19-W-09	Pressure District 7 Elevated Tank	South of Highland Rd, west of First Rd E			7 ML	$6,267,000			$0	$6,267,000	$0	$0		10+		X		
SCU20-W-09	Centennial Pkwy Trunk Feedermain	Isaac Brock Dr to Centennial Pkwy	Centennial Pkwy to Rymal Rd E	3580	1050	$10,663,000				$10,663,000	$0	$0		10+		X		
SCU21-W-09	New Zone 7 Booster Pumping Station	Upper Centennial Pkwy and Rymal Rd E			1150 L/s	$8,360,000			$0	$8,360,000	$0	$0		10+		X		
Total Stoney Creek Upper (6 Years to UBBO)						**$56,341,000**			**$8,700,000**	**$46,045,000**	**$0**	**$1,596,000**	**$0**					

Table E1.7a Stoney Creek Lower Water Distribution System Development Charges Works (Planning Period - 0 to 5 Years)

Project ID	Project/Street	From	To	Length (m)	Size (mm)	Estimated Total Cost ($2011)	Benefit to Existing	Oversizing	Direct Developer Contribution ($2011)	Development Charges ($2011)	Post Period Benefit ($2011)	Benefit to Existing ($2011)	Amount already funded from DC Reserve	City of Hamilton Timing Estimate	Updated Budget Cost/ Actual	Engineering Benchmarks Adjustments	Scope Change	Project Added
SCL5-W-09	McNeilly Rd.	Barton St.	Railway	550	300	$529,000			$0	$529,000	$0	$0		0-5		X		
SCL6-W-09	Glover Rd.	Barton St.	Service Rd. Extension	700	300	$674,000			$0	$674,000	$0	$0		0-5		X		
SCL13-W-09	Winona Rd.	Service Rd.	Petit Rd.	250	300	$240,000			$0	$240,000	$0	$0		0-5		X		
SCL14-W-09	South Service Rd.	Fifty Rd	Winona Rd	900	300	$866,000			$866,000	$0	$0	$0		0-5		X		
SCL15-W-11	SCUBE Additional Internal Servicing					$2,000,000			$0	$2,000,000	$0	$0		0-5				X
Total Stoney Creek Lower (0 to 5 Years)						**$4,309,000**			**$866,000**	**$3,443,000**	**$0**	**$0**						

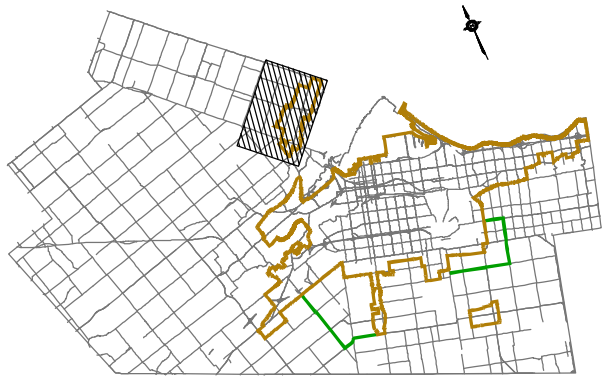
Table E1.7b Stoney Creek Lower Water Distribution System Development Charges Works (Planning Period - 6 Years to UBBO)

Project ID	Project/Street	From	To	Length (m)	Size (mm)	Estimated Total Cost ($2011)	Benefit to Existing	Oversizing	Direct Developer Contribution ($2011)	Development Charges ($2011)	Post Period Benefit ($2011)	Benefit to Existing ($2011)	Amount already funded from DC Reserve	City of Hamilton Timing Estimate	Updated Budget Cost/ Actual	Engineering Benchmarks Adjustments	Scope Change	Project Added
SCL4-W-09	Replacement on Lewis Rd.	Hwy 8	Barton St.	500	300	$481,000			$0	$481,000	$0	$0		6-10		X		
SCL7-W-09	Millen Rd.	South Service Rd.	Barton St.	1000	400	$1,369,000			$0	$1,369,000	$0	$0		6-10		X		
SCL8-W-09	South Service Rd.	Fruitland Rd.	Jones Rd.	900	400	$1,233,000			$0	$1,233,000	$0	$0		6-10		X		
SCL9-W-09	South Service Rd.	Millen Rd.	Seaman St.	1600	400	$2,190,000			$0	$2,190,000	$0	$0		6-10		X		
SCL10-W-09	Dewitt Rd.	CNR Tracks	Barton St.	610	300	$588,000			$0	$588,000	$0	$0		6-10		X		
SCL11-W-09	Jones Rd.	South Service Rd.	Barton St.	915	400	$1,253,000			$0	$1,253,000	$0	$0		6-10		X		
SCL12-W-09	Fifty Rd.	Hwy 8	Barton St.	245	300	$236,000			$0	$236,000	$0	$0		6-10		X		
Total Stoney Creek Lower (6 Years to UBBO)						**$7,350,000**			**$0**	**$7,350,000**	**$0**	**$0**						

Table E1.8 Flamborough Excluding Waterdown Water Distribution System Development Charges Works (Planning Period - 0 to 5 Years)

Project ID	Project/Street	From	To	Length (m)	Size (mm)	Estimated Total Cost ($2011)	Benefit to Existing	Oversizing	Direct Developer Contribution ($2011)	Development Charges ($2011)	Post Period Benefit ($2011)	Benefit to Existing ($2011)	Amount already funded from DC Reserve	Updated Budget Cost/ Actual	Engineering Benchmarks Adjustments	Scope Change	Project Added
F1-W-09	Carlisle Communal System- Elevated Storage (5140 m3) approx. 450m south of Progreston					$2,492,000			$0	$2,492,000	$0	$0			X		
F2-W-09	FDC04 Carlisle Well- Secure Well Head					$70,000			$0	$70,000	$0	$0			X		
F3-W-09	Watermain on Centre Road, Carlisle- 385m of 400mm dia from 450m south of Progreston to Blue Heron	450m south of Progreston	Blue Heron	385	400	$528,000			$371,000	$157,000	$0	$0			X		
F4-W-09	Watermain on Progreston Rd, Carlisle	Centre Road	Blue Heron	230	400	$315,000			$221,000	$94,000	$0	$0			X		
Total Flamborough (0 to 5 Years)						**$3,405,000**			**$592,000**	**$2,813,000**	**$0**	**$0**					

KEY PLAN N.T.S.



LEGEND

- WATERMAIN EXISTING
- PUMPING STATION EXISTING
- WATERMAIN 0 – 5 YEARS
- WATER TOWER/RESERVOIR 0 – 5 YEARS
- PUMPING STATION 0 – 5 YEARS
- WATERMAIN 6 PLUS YEARS
- WATER TOWER/RESERVOIR 6 PLUS YEARS
- PUMPING STATION 6 PLUS YEARS
- WATERMAIN–100% DIRECT DEVELOPMENT CONTRIBUTION
- DEVELOPMENT AREAS
- GROWTH BOUNDARY UNDER GRIDS
- URBAN BOUNDARY

AECOM

0 1000 2000m

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DRAFT

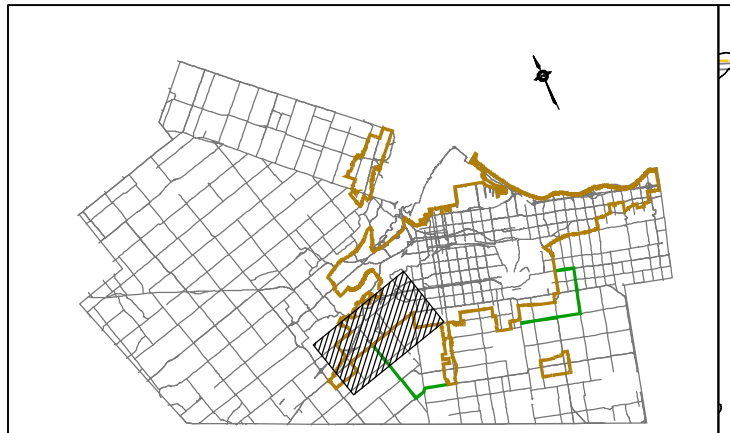
Hamilton Development Charges Background Study

Figure E1-1

Waterdown Watermain

E-31

DATE: MARCH 2011
FILE: G712-001-00_00-G-P204_RX.dwg



KEY PLAN

LEGEND

- WATERMAIN EXISTING
- PUMPING STATION EXISTING
- WATERMAIN 0 – 5 YEARS
- WATER TOWER/RESERVOIR 0 – 5 YEARS
- PUMPING STATION 0 – 5 YEARS
- WATERMAIN 6 PLUS YEARS
- WATER TOWER/RESERVOIR 6 PLUS YEARS
- PUMPING STATION 6 PLUS YEARS
- WATERMAIN–100% DIRECT DEVELOPMENT CONTRIBUTION
- DEVELOPMENT AREAS
- GROWTH BOUNDARY UNDER GRIDS
- URBAN BOUNDARY

AECOM

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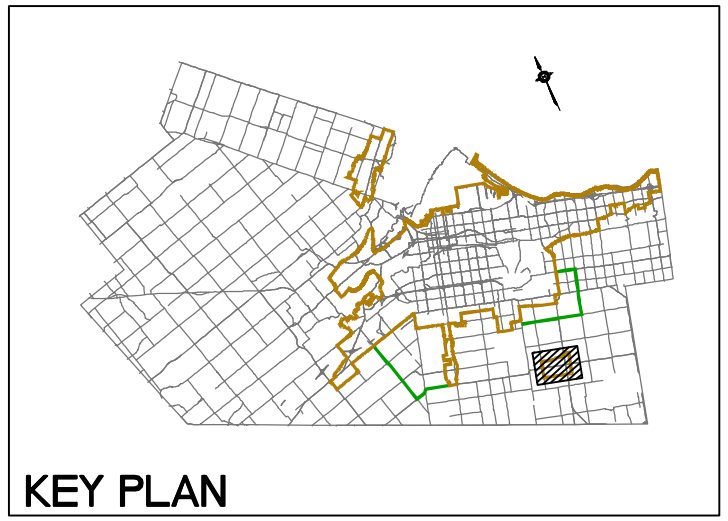
Hamilton Development Charges Background Study

Figure E1-2

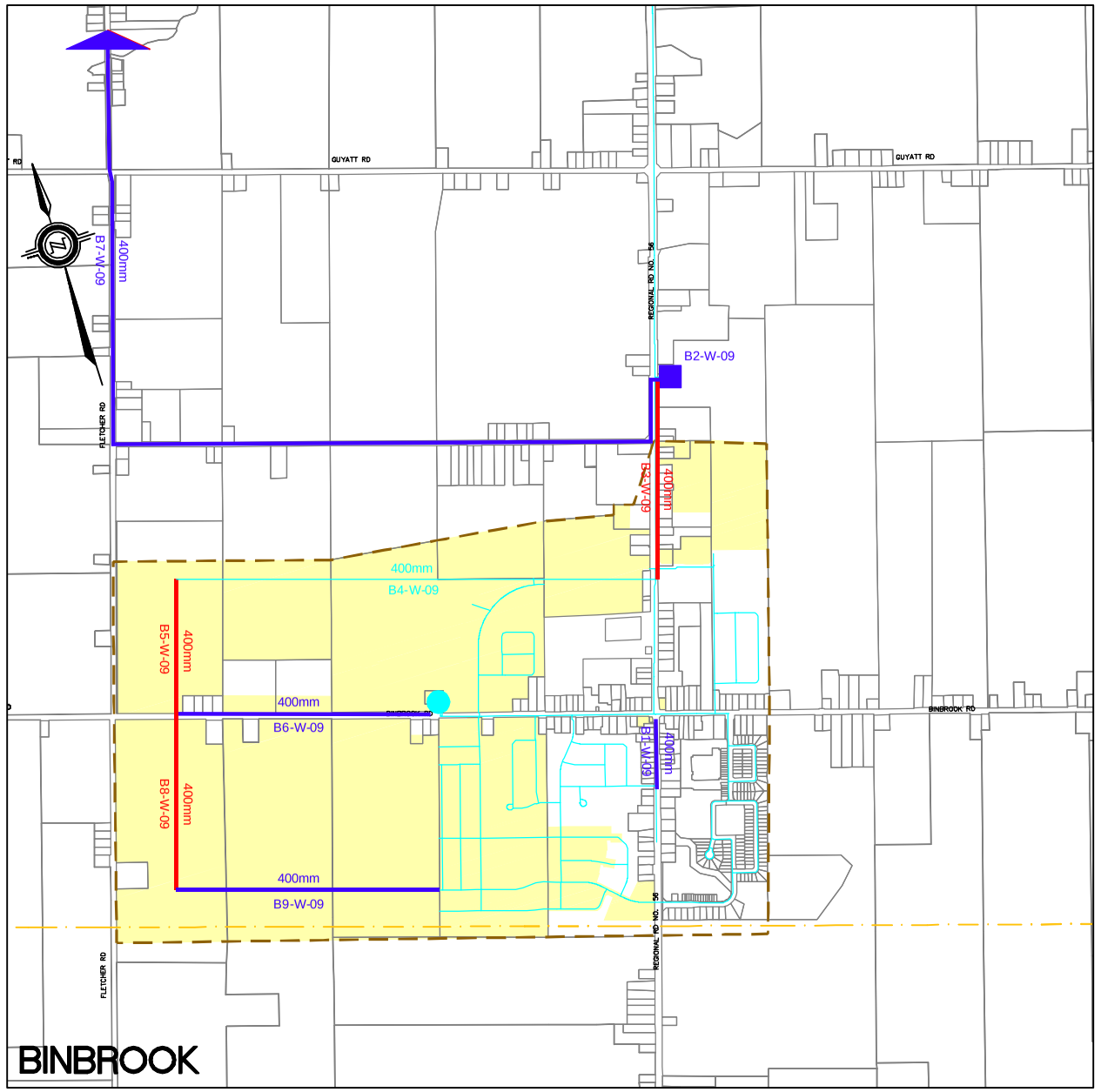
Ancaster Watermain

DATE: MARCH 2011
FILE: G712-001-00_00-G-P202_RX.dwg



LEGEND

- WATERMAIN EXISTING
- PUMPING STATION EXISTING
- WATERMAIN 0 – 5 YEARS
- WATER TOWER/RESERVOIR 0 – 5 YEARS
- PUMPING STATION 0 – 5 YEARS
- WATERMAIN 6 PLUS YEARS
- WATER TOWER/RESERVOIR 6 PLUS YEARS
- PUMPING STATION 6 PLUS YEARS
- WATERMAIN–100% DIRECT DEVELOPMENT CONTRIBUTION
- DEVELOPMENT AREAS
- GROWTH BOUNDARY UNDER GRIDS
- URBAN BOUNDARY



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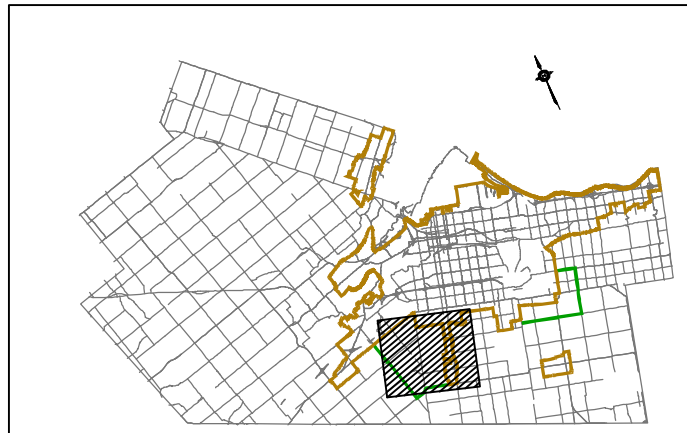
Hamilton Development Charges Background Study

Figure E1-3

Binbrook Watermain

E-33

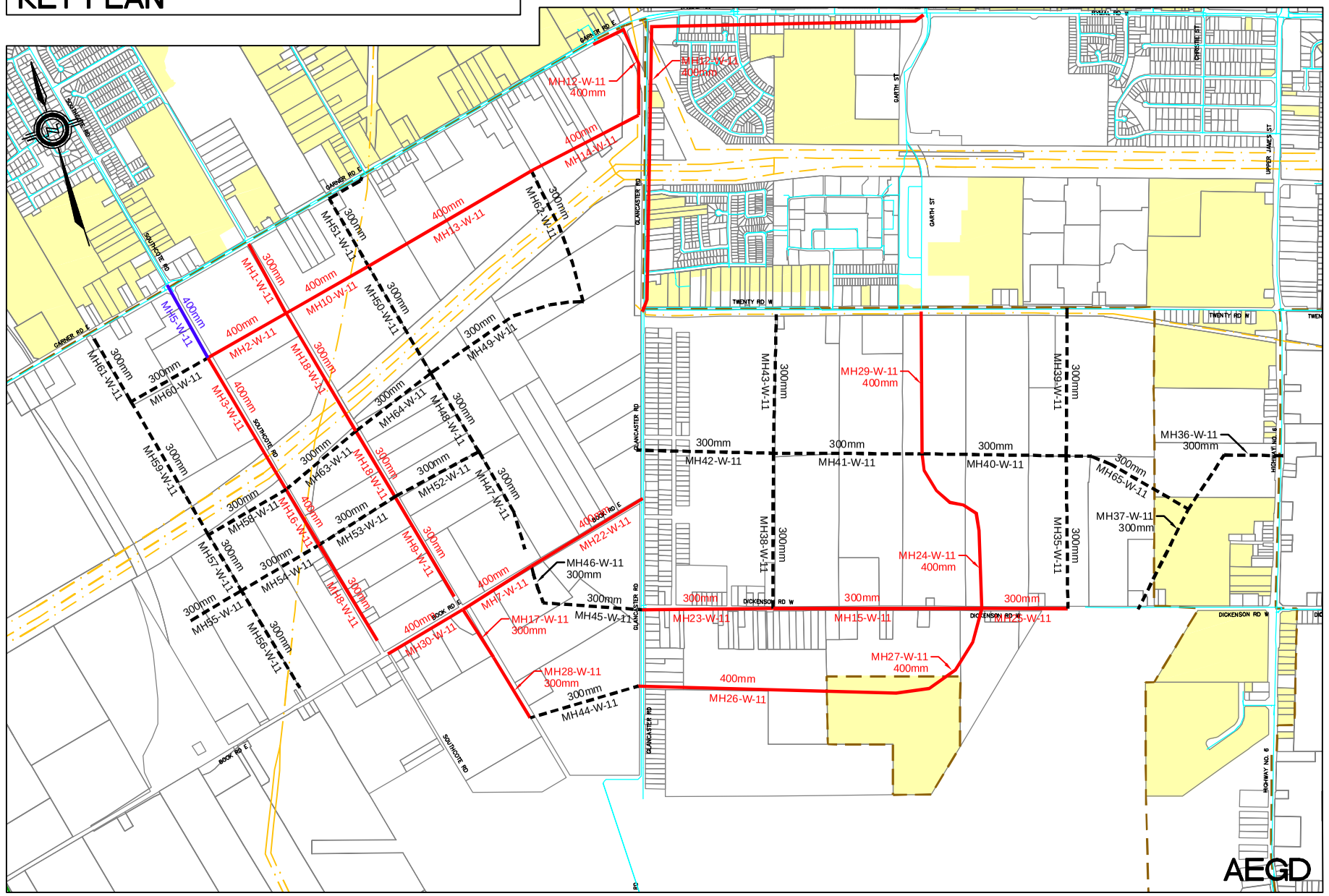
DATE: MARCH 2011
G712-001-00_00-G-P206_RX.dwg

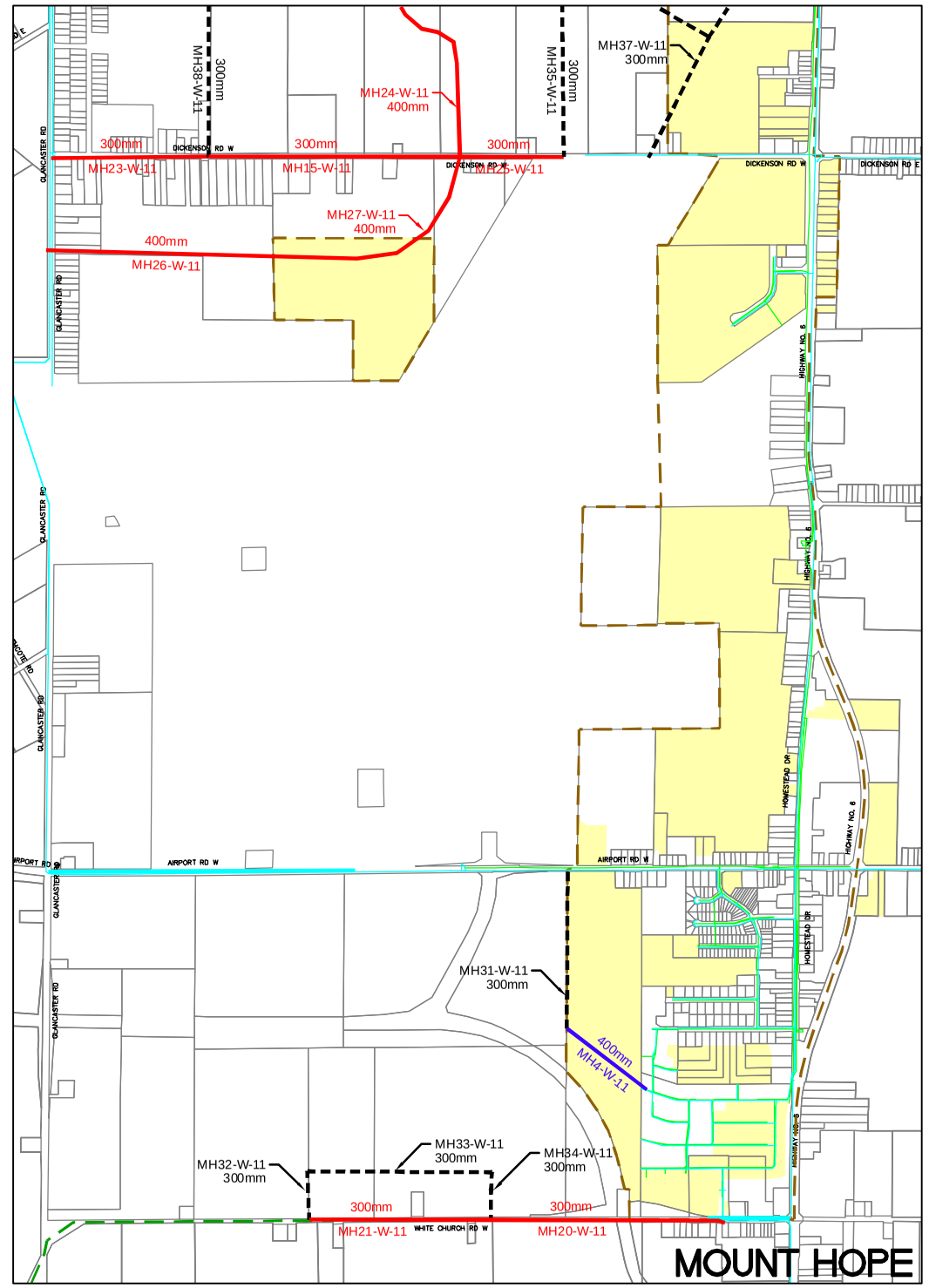


KEY PLAN

LEGEND

- WATERMAIN EXISTING
- PUMPING STATION EXISTING
- WATERMAIN 0 – 5 YEARS
- WATER TOWER/RESERVOIR 0 – 5 YEARS
- PUMPING STATION 0 – 5 YEARS
- WATERMAIN 6 PLUS YEARS
- WATER TOWER/RESERVOIR 6 PLUS YEARS
- PUMPING STATION 6 PLUS YEARS
- WATERMAIN–100% DIRECT DEVELOPMENT CONTRIBUTION
- DEVELOPMENT AREAS
- GROWTH BOUNDARY UNDER GRIDS
- URBAN BOUNDARY





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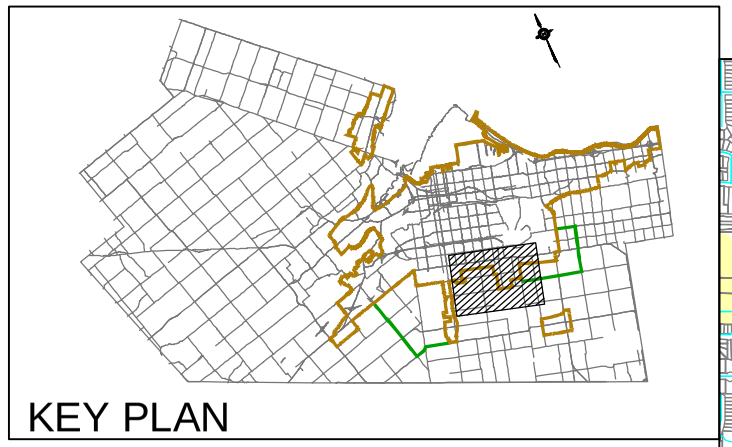
Hamilton Development Charges Background Study

Figure E1-4

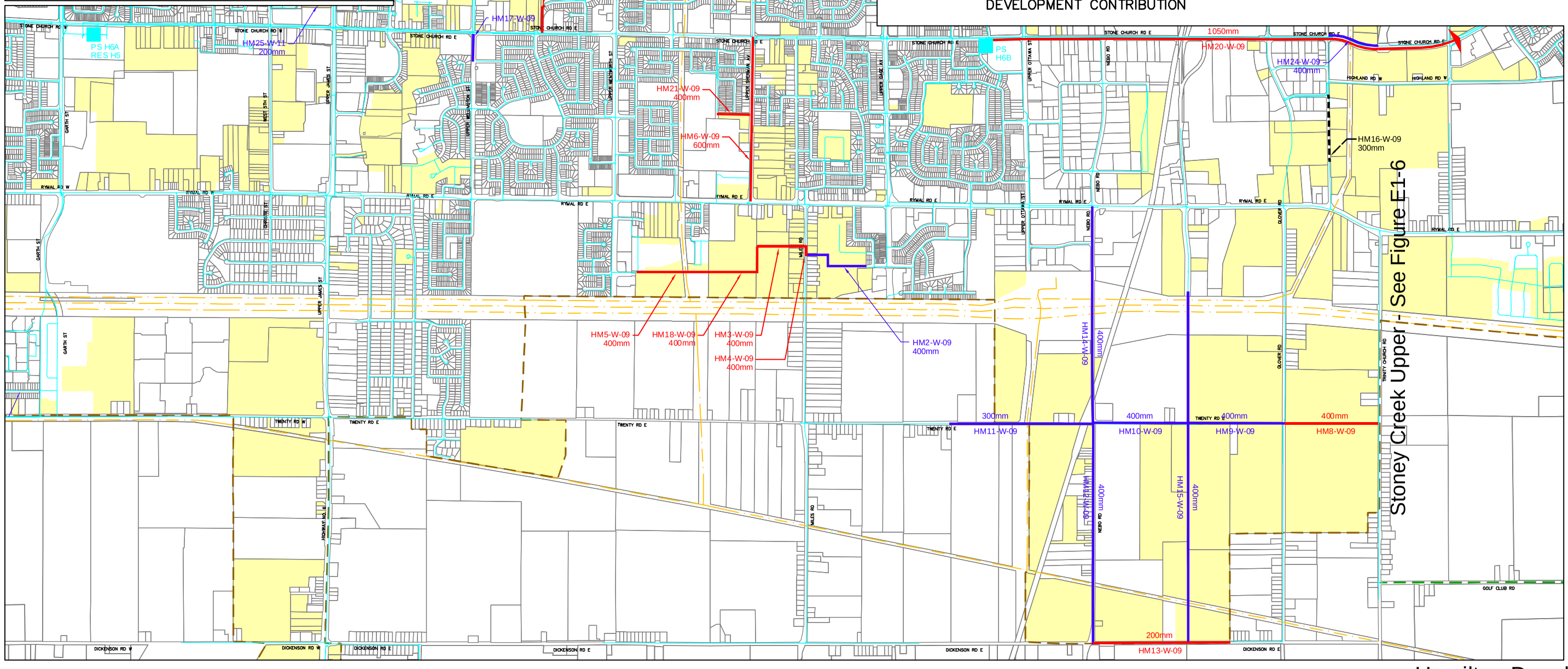
AEGD / Mount Hope Watermain

DATE: MARCH 2011
G712--001--00_00--G--P214_RX.dwg



LEGEND

- WATERMAIN EXISTING
- PUMPING STATION EXISTING
- WATERMAIN 0 – 5 YEARS
- WATER TOWER/RESERVOIR 0 – 5 YEARS
- PUMPING STATION 0 – 5 YEARS
- WATERMAIN 6 PLUS YEARS
- WATER TOWER/RESERVOIR 6 PLUS YEARS
- PUMPING STATION 6 PLUS YEARS
- WATERMAIN–100% DIRECT DEVELOPMENT CONTRIBUTION
- DEVELOPMENT AREAS
- GROWTH BOUNDARY UNDER GRIDS
- URBAN BOUNDARY



Hamilton Development Charges Background Study

Figure E1-5
Hamilton Mountain Watermain

AECOM

0 1000 2000m

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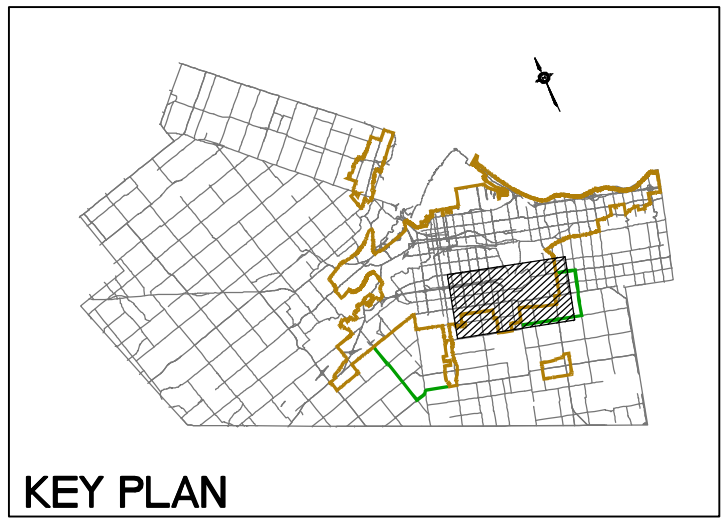
DATE: MARCH 2011
FILE: G712-001-00_00-G-P208_RX.dwg



KEY PLAN

LEGEND

- WATERMAIN EXISTING
- PUMPING STATION EXISTING
- WATERMAIN 0 – 5 YEARS
- WATER TOWER/RESERVOIR 0 – 5 YEARS
- PUMPING STATION 0 – 5 YEARS
- WATERMAIN 6 PLUS YEARS
- WATER TOWER/RESERVOIR 6 PLUS YEARS
- PUMPING STATION 6 PLUS YEARS
- WATERMAIN–100% DIRECT DEVELOPMENT CONTRIBUTION
- DEVELOPMENT AREAS
- GROWTH BOUNDARY UNDER GRIDS
- URBAN BOUNDARY

PS H5A
PS H6B
SCU18-W-09
SCU11-W-09
400mm SCU5-W-09
SCU6-W-09 400mm
SCU3-W-09 300mm
400mm SCU4-W-09
400mm SCU9-W-09
SCU12-W-09 1200mm
SCU10-W-09 400mm
SCU20-W-09 1050mm
SCU19-W-09
SCU16-W-09 300mm
SCU7-W-09 SCU8-W-09
SCU14-W-09 400mm
SCU15-W-09 400mm
SCU21-W-09
400mm SCU2-W-09
300mm SCU1-W-09
300mm SCU13-W-09
Hamilton Mountain – See Figure E1-5

Hamilton Development Charges Background Study

Figure E1-6
Stoney Creek Upper Watermain

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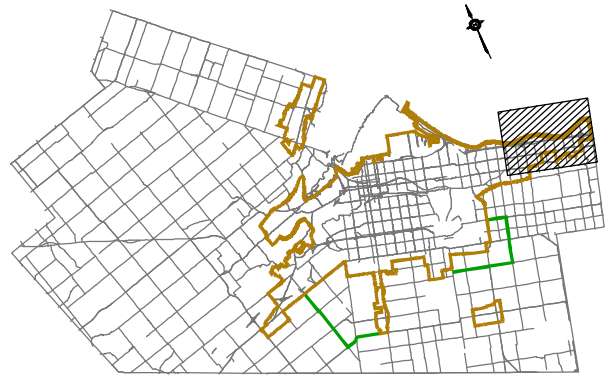
DATE: MARCH 2011
FILE: G712-001-00_00-G-P210_RX.dwg



KEY PLAN

LEGEND

- WATERMAIN EXISTING
- PUMPING STATION EXISTING
- WATERMAIN 0 – 5 YEARS
- WATER TOWER/RESERVOIR 0 – 5 YEARS
- PUMPING STATION 0 – 5 YEARS
- WATERMAIN 6 PLUS YEARS
- WATER TOWER/RESERVOIR 6 PLUS YEARS
- PUMPING STATION 6 PLUS YEARS
- WATERMAIN–100% DIRECT DEVELOPMENT CONTRIBUTION
- DEVELOPMENT AREAS
- GROWTH BOUNDARY UNDER GRIDS
- URBAN BOUNDARY

SCL9-W-09 400mm
SCL7-W-09 400mm
SCL8-W-09 400mm
SCL10-W-09 300mm
SCL11-W-09 400mm
300mm SCL2-W-09
300mm SCL6-W-09
300mm SCL1-W-09
300mm SCL3-W-09
SCL5-W-09 300mm
SCL4-W-09 300mm
SCL13-W-09 300mm
SCL14-W-09 300mm
SCL12-W-09 300mm

AECOM

0 1000 2000m

1: 25000

DRAFT

Hamilton Development Charges Background Study

Figure E1-7
Stoney Creek Lower Watermain

E-37

DATE: MARCH 2011
FILE: 6712-001-00_00-G-P212_RX.dwg

ATTACHMENT B

WASTEWATER PROJECTS

Table E2.1a Waterdown Sanitary Sewage System Development Charges Works (Planning Period - 0 to 5 Years)

Project ID	Project/Street	From	To	Length (m)	Size (mm)	Estimated Total Cost ($2011)	Benefit to Existing	Oversizing	Direct Developer Contribution ($2011)	Development Charges ($2011)	Post Period Benefit ($2011)	Benefit to Existing ($2011)	Amount already funded from DC Reserve	City of Hamilton Timing Estimate	Updated Budget Cost/ Actual	Engineering Benchmarks Adjustments	Scope Change	Project Added
W3-S-09	Waterdown North Area	700m north of Parkside Rd.	Parkside Drive	700	600	$511,000			$436,000	$75,000	$0	$0		0-5		X		
W6-S-09	DC014- Existing Pump Capacity & Wet Well upgrade at 1st St./ Hwy 5				200 L/S	$473,000			$0	$473,000	$0	$0		0-5		X		
W7-S-09	WWTP Decommissioning, New Waterdown SPS					$6,793,000	90%		$0	$679,000	$0	$6,114,000		0-5		X		
W8-S-09	New Forcemain on Flamboro St	SPS	Hwy 5	600	450	$941,000	90%		$0	$94,000	$0	$847,000		constructed - PW-08-38		X		
W9-S-09	New Forcemain on Hwy 5	Flamboro St	Borers Trunk	1250	450	$1,881,000	90%		$0	$188,000	$0	$1,693,000		constructed - PW-09-16		X		
W13-S-11	Internal North Waterdown Road	600 m north of Parkside Dr	Parkside Drive	600	525	$399,000			$373,000	$26,000	$0	$0		0-5				X
Total Waterdown (0 to 5 Years)						**$10,998,000**			**$809,000**	**$1,535,000**	**$0**	**$8,654,000**	**$0**					

Table E2.1b Waterdown Sanitary Sewage System Development Charges Works (Planning Period - 6 Years to UBBO)

Project ID	Project/Street	From	To	Length (m)	Size (mm)	Estimated Total Cost ($2011)	Benefit to Existing	Oversizing	Direct Developer Contribution ($2011)	Development Charges ($2011)	Post Period Benefit ($2011)	Benefit to Existing ($2011)	Amount already funded from DC Reserve	City of Hamilton Timing Estimate	Updated Budget Cost/ Actual	Engineering Benchmarks Adjustments	Scope Change	Project Added
Total Waterdown (6 Years to UBBO)																		

Table E2.2a Ancaster Sanitary Sewage System Development Charges Works (Planning Period - 0 to 5 Years)

Project ID	Project/Street	From	To	Length (m)	Size (mm)	Estimated Total Cost ($2011)	Benefit to Existing	Oversizing	Direct Developer Contribution ($2011)	Development Charges ($2011)	Post Period Benefit ($2011)	Benefit to Existing ($2011)	Amount already funded from DC Reserve	City of Hamilton Timing Estimate	Updated Budget Cost/ Actual	Engineering Benchmarks Adjustments	Scope Change	Project Added
A6-S-09	HC008 - Decommission Existing Harmony Hall SPS					$118,000	90%		$0	$12,000	$0	$106,000		0-5		X		
A7-S-09	New Southcote Woodlands SPS	Southcote Rd.			39 L/s	$1,561,000			$0	$1,561,000	$0	$0		constructed - Southcote Woodlands Ph 2		X		
A10-S-09	Southcote Rd	Gray Ct Dr	John Frederick Dr	200	450	$248,000			$0	$248,000	$0	$0		0-5		X		
A13-S-09	Ancaster Industrial Park Area- South Connection	Given Rd Extension	Cormorant Rd Extension	825	450	$514,000			$0	$514,000	$0	$0		0-5		X		
A14-S-09	Southcote Woodlands SPS Upgrades	Southcote Rd.			79 L/s	$261,000			$0	$261,000	$0	$0		0-5		X		
A15-S-09	HC011-Calvin St SPS Upgrades	Additional Pump at existing SPS			59 L/s	$236,000			$0	$236,000	$0	$0		0-5		X		
A18-S-09	Ancaster Industrial Park Area - Cormorant Rd Extension	Bittern Dr.	400m east	400	600	$293,000			$249,000	$44,000	$0	$0		constructed - Ancaster industrial Park Ph 5		X		
A20-S-11	Valeri Business park - Cormorant Rd	80 m west of Osprey	315m west	315	1050	$465,000			$196,000	$34,000	$235,000	$0		0-5				X
Total Ancaster (0 to 5 Years)						**$3,696,000**			**$445,000**	**$2,910,000**	**$235,000**	**$106,000**	**$0**					

Table E2.2b Ancaster Sanitary Sewage System Development Charges Works (Planning Period - 6 Years to UBBO) **0**

Project ID	Project/Street	From	To	Length (m)	Size (mm)	Estimated Total Cost ($2011)	Benefit to Existing	Oversizing	Direct Developer Contribution ($2011)	Development Charges ($2011)	Post Period Benefit ($2011)	Benefit to Existing ($2011)	Amount already funded from DC Reserve	City of Hamilton Timing Estimate	Updated Budget Cost/ Actual	Engineering Benchmarks Adjustments	Scope Change	Project Added
A17-S-09	Area north of Garner Rd.E./between Miller Dr and Hwy 6	Garner Rd.	200 m east of Miller Dr	500	600	$365,000			$311,000	$54,000	$0	$0		6-10		X		
A19-S-09	Southcote Woodlands SPS Upgrades	Southcote Rd.			112 L/s	$261,000			$0	$261,000	$0	$0		6-10		X		
Total Ancaster (6 Years to UBBO)						**$626,000**			**$311,000**	**$315,000**	**$0**	**$0**	**$0**					

Table E2.3a Binbrook Sanitary Sewage System Development Charges Works (Planning Period - 0 to 5 Years)

Project ID	Project/Street	From	To	Length (m)	Size (mm)	Estimated Total Cost ($2011)	Benefit to Existing	Oversizing	Direct Developer Contribution ($2011)	Development Charges ($2011)	Post Period Benefit ($2011)	Benefit to Existing ($2011)	Amount already funded from DC Reserve	City of Hamilton Timing Estimate	Updated Budget Cost/ Actual	Engineering Benchmarks Adjustments	Scope Change	Project Added
B2-S-09	P.S. HCO58 Upgrade - Regional Rd. 56 at Southbrook Dr.	2 Additional Pumps including 1 standby			340L/S	$259,000			$0	$259,000	$0	$0		0-5		X		
B3-S-09	Forcemain - RR56	P.S. HCO58	Golf Club Rd.	4200	450	$5,509,000			$0	$5,509,000	$0	$0		0-5		X	X	
B9-S-09	Binbrook Rd.	820m west of Regional Rd. 56	200m east of Fletcher Rd	1100	375	$666,000			$0	$666,000	$0	$0		0-5		X		
B11-S-11	RR56	Viking Dr	Maggie Johnson Dr	800	375	$923,000			$0	$923,000	$0	$0		0-5				X
B12-S-11	Binbrook Rd W	70 m west of Kaufman	70 m west or RR56	425	250	$455,000			$0	$455,000	$0	$0		0-5				X
Total Binbrook (0 to 5 Years)						**$7,812,000**			**$0**	**$7,812,000**	**$0**	**$0**	**$0**					

Table E2.3b Binbrook Sanitary Sewage System Development Charges Works (Planning Period - 6 Years to UBBO)

Project ID	Project/Street	From	To	Length (m)	Size (mm)	Estimated Total Cost ($2011)	Benefit to Existing	Oversizing	Direct Developer Contribution ($2011)	Development Charges ($2011)	Post Period Benefit ($2011)	Benefit to Existing ($2011)	Amount already funded from DC Reserve	City of Hamilton Timing Estimate	Updated Budget Cost/ Actual	Engineering Benchmarks Adjustments	Scope Change	Project Added
B10-S-09	Development south of Binbrook Rd.	420m East of Fletcher Rd.	1220m East of Fletcher Rd.	800	525	$531,000			$498,000	$33,000	$0	$0		6-10		X		
Total Binbrook (6 Years to UBBO)						**$531,000**			**$498,000**	**$33,000**	**$0**	**$0**						

Table E2.4a Mount Hope Sanitary Sewage System Development Charges Works (Planning Period - 0 to 5 Years)

Project ID	Project/Street	From	To	Length (m)	Size (mm)	Estimated Total Cost ($2011)	Benefit to Existing	Oversizing	Direct Developer Contribution ($2011)	Development Charges ($2011)	Post Period Benefit ($2011)	Benefit to Existing ($2011)	Amount already funded from DC Reserve	City of Hamilton Timing Estimate	Updated Budget Cost/ Actual	Engineering Benchmarks Adjustments	Scope Change	Project Added
MH1-S-11	AEGD Project C-2 - Sewer on Twenty Rd	East of Garth St	Upper James St	1400	375	$848,000				$848,000							X	X
MH2-S-11	AEGD Project C-3 - Sewer on Southcote Rd	Hydro Corridor	Garner Rd	875	375	$530,000				$530,000							X	X
MH3-S-11	AEGD Project C-4 - Sewer on Garner Rd	Hwy 6	Kitty Murray Ln	1150	375	$2,051,000				$2,051,000							X	X
MH4-S-11	AEGD Project C-5 - Sewer on Garner Rd	Kitty Murray Ln	Springbrook Ave	630	450	$1,271,000				$1,271,000							X	X
MH5-S-11	AEGD Project C-5a - Sewer on Smith Rd	Hydro Corridor	Garner Rd	700	375	$424,000				$424,000							X	X
MH6-S-11	AEGD Project C-6 - Sewer on Garner Rd	Springbrook Rd	Raymond Rd	880	600	$643,000				$643,000							X	X
MH7-S-11	AEGD Project C-7 - Sewer on Internal Road		Provident Way	850	375	$515,000				$515,000							X	X
MH8-S-11	AEGD Project SPS2 - Twenty Rd SPS Upgrades	Pumping and electrical upgrades				$700,000				$700,000							X	X
MH23-S-11	Orlick Sewer (Dickenson Rd)	Hwy 6	250 m west	250	600	$371,000			$309,000	$62,000	$0	$0					X	X
Total Mount Hope (0 to 5 Years)						**$7,353,000**			**$309,000**	**$7,044,000**								

Table E2.4b Mount Hope Sanitary Sewage System Development Charges Works (Planning Period - 6 Years to UBBO)

Project ID	Project/Street	From	To	Length (m)	Size (mm)	Estimated Total Cost ($2011)	Benefit to Existing	Oversizing	Direct Developer Contribution ($2011)	Development Charges ($2011)	Post Period Benefit ($2011)	Benefit to Existing ($2011)	Amount already funded from DC Reserve	City of Hamilton Timing Estimate	Updated Budget Cost/ Actual	Engineering Benchmarks Adjustments	Scope Change	Project Added
MH9-S-11	AEGD Project C-11f - Sewer on Glancaster Rd	Twenty Rd	600 m south	600	375	$364,000		$291,000		$364,000							X	X
MH10-S-11	AEGD Project C-12 - Dickenson Rd/Book Rd Trunk Sewer - Sect I	West of Glancaster	Upper James St	3339	750	$9,929,000				$9,929,000							X	X
MH11-S-11	AEGD Project C-13 - Dickenson Rd/Book Rd Trunk Sewer - Sect II	400 m west of Southcote	West of Glancaster	1175	600	$3,010,000				$3,010,000							X	X
MH12-S-11	AEGD Project C-13b - Sewer on Smith Rd	Hydro Corridor	Book Rd	950	375	$575,000				$575,000							X	X
MH13-S-11	AEGD Project C-14 - Sewer on Garth St Extension	Smith Rd	Dickenson Rd	2275	525	$5,193,000			$4,595,500	$597,500							X	X
MH14-S-11	AEGD Project C-14b - Sewer on Glancaster Rd	Airport	Garth St Extension	450	375	$273,000				$273,000							X	X
MH15-S-11	AEGD Project C-14c - Sewer on Glancaster Rd	Dickenson Rd	Garth St Extension	375	375	$228,000				$228,000							X	X
MH16-S-11	AEGD Project C-14d - Sewer on Glancaster Rd	Book Rd	Dickenson Rd	500	375	$303,000				$303,000							X	X
MH17-S-11	AEGD Project C-15a - Sewer on Book Rd	350 m east of Smith Rd	Smith Rd	350	375	$213,000				$213,000							X	X
MH18-S-11	AEGD Project C-15b - Sewer on Book Rd	Glancaster Rd	575 m west of Glancaster Rd	575	375	$349,000				$349,000							X	X
MH19-S-11	AEGD Project C-16 - Sewer on Southcote Rd	Hydro Corridor	Book Rd	875	375	$530,000				$530,000							X	X
MH20-S-11	AEGD Project C-20c - Sewer on Smith Rd	275 m south of Book Rd	Book Rd	275	375	$166,000				$166,000							X	X
MH21-S-11	AEGD Project SPS1 - New 40 L/s Sewage Pumping Station	White Church Rd - 1200 m west of Upper James St			40 L/s	$1,847,000	$0	$0		$1,847,000							X	X
MH22-S-11	AEGD Project FM - 300 mm forcemain on White Church Rd and Upper James St	SPS	1000 m south of Dickenson Rd	4700	300	$2,925,000				$2,925,000							X	X
Total Mount Hope (6 Years to UBBO)						**$25,905,000**	**$0**	**$291,000**	**$4,595,500**	**$21,309,500**								

Table E2.5a Hamilton Mountain Sanitary Sewage System Development Charges Works (Planning Period - 0 to 5 Years)

Project ID	Project/Street	From	To	Length (m)	Size (mm)	Estimated Total Cost ($2011)	Benefit to Existing	Oversizing	Direct Developer Contribution ($2011)	Development Charges ($2011)	Post Period Benefit ($2011)	Benefit to Existing ($2011)	Amount already funded from DC Reserve	City of Hamilton Timing Estimate	Updated Budget Cost/ Actual	Engineering Benchmarks Adjustments	Scope Change	Project Added
HM7-S-09	Glanbrook Industrial Park	Twenty Rd	Existing trunk 430m north of Twenty Rd. MH GK01A07	550	600	$390,000			$0	$390,000	$0	$0		constructed - PW-10-39	X		X	
HM8-S-09	Nebo Rd.	800m south of Twenty Rd.	Twenty Rd.	825	375	$951,000			$475,500	$475,500	$0	$0		0-5		X		
HM9-S-09	Nebo Rd.	250m north of Twenty Rd. East	425m south of Rymal Rd.	630	375	$728,000			$0	$728,000	$0	$0		Partially Constructed (60 m under PW-10-13)	X	X		
HM12-S-09	Twenty Rd.	Nebo Rd.	650m east of Nebo Rd.	650	450	$308,983			$0	$308,983	$0	$0		constructed - PW-10-39	X			
HM14-S-09	Properties north of Rymal Rd. East of Pritchard Rd.	Pritchard Rd	Anchor Rd.	190	375	$144,000			$0	$144,000	$0	$0		0-5		X		
HM17-S-09	P.S. HC018 Upgrade (new pumps)	Upgrade to 590 L/S				$429,000			$0	$429,000	$0	$0		0-5		X		
HM25-S-09	Properties north of Rymal Rd. East of Pritchard Rd.	Pritchard Rd	Trinity Church Rd Extension	350	375	$265,000			$0	$265,000	$0	$0		0-5		X		
Total Hamilton Mountain (0 to 5 Years)						**$3,215,983**			**$475,500**	**$2,740,483**	**$0**	**$0**						

Table E2.5b Hamilton Mountain Sanitary Sewage System Development Charges Works (Planning Period - 6 Years to UBBO)

Project ID	Project/Street	From	To	Length (m)	Size (mm)	Estimated Total Cost ($2011)	Benefit to Existing	Oversizing	Direct Developer Contribution ($2011)	Development Charges ($2011)	Post Period Benefit ($2011)	Benefit to Existing ($2011)	Amount already funded from DC Reserve	City of Hamilton Timing Estimate	Updated Budget Cost/ Actual	Engineering Benchmarks Adjustments	Scope Change	Project Added
HM3-S-09	Miles/Shermal/Chappel Estates	Connection of sewers east and west of Miles Rd		100	375	$60,000			$0	$60,000	$0	$0		6-10		X		
HM6-S-09	Commercial development between Dickenson Rd. & Twenty Rd.	600m north of Dickenson Rd	1120m north of Dickenson Rd.	520	525	$345,000			$324,000	$21,000	$0	$0		6-10		X		
HM10-S-09	Upper Ottawa St.	275m north of Twenty Rd. East	350m south of Rymal Rd.	675	375	$510,000			$0	$510,000	$0	$0		6-10		X		
HM19-S-09	Hwy 6 Trunk Sewer	2.3 km south of Dickenson Rd	Dickenson Rd	2279	900	$6,811,000			$0	$6,811,000	$0	$0		10+		X		
HM20-S-09	Dickenson Rd. Trunk Sewer	Hwy 6	Dickenson Rd SPS	3689	900	$11,025,000			$0	$11,025,000	$0	$0		10+		X		
HM21-S-09	Dickenson Rd. SPS	Near Dickenson Rd and Miles Rd.			500 L/s	$10,450,000			$0	$10,450,000	$0	$0		10+		X		
HM22-S-09	Dickenson Rd. Forcemain	New Dickenson Rd SPS	Trinity Church Rd	2900	600	$4,167,000			$0	$4,167,000	$0	$0		10+		X		
HM23-S-09	Upper Sherman Ave.	250m North of Rymal Rd. E	Acadia Dr. Existing MH HJ20A067	275	250	$294,000			$0	$294,000	$0	$0		6-10		X		
HM24-S-09	Acadia Dr.	West of Upper Sherman	Acadia Dr. Existing	200	250	$214,000			$0	$214,000	$0	$0		6-10		X		
HM26-S-09	Golf Club Rd	Trinity Church Rd, south of Golf Club Rd	Upper Centennial Pkwy	3400	900	$10,162,000			$0	$10,162,000	$0	$0		10+		X		
Total Hamilton Mountain (6 Years to UBBO)						**$44,038,000**			**$324,000**	**$43,714,000**	**$0**	**$0**						

Table E2.6a Stoney Creek Upper Sanitary Sewage System Development Charges Works (Planning Period - 0 to 5 Years)

Project ID	Project/Street	From	To	Length (m)	Size (mm)	Estimated Total Cost ($2011)	Benefit to Existing	Oversizing	Direct Developer Contribution ($2011)	Development Charges ($2011)	Post Period Benefit ($2011)	Benefit to Existing ($2011)	Amount already funded from DC Reserve	City of Hamilton Timing Estimate	Updated Budget Cost/ Actual	Engineering Benchmarks Adjustments	Scope Change	Project Added
SCU5-S-09	Rymal Rd.	Upper Centennial	2nd Rd. West	1650	600	$2,829,000			$0	$2,829,000	$0	$0		0-5		x		
SCU6-S-09	Rymal Rd.	2nd Rd. West	Fletcher Rd.	850	450	$1,947,000			$0	$1,947,000	$0	$0		0-5		x		
SCU7-S-09	Rymal Rd.	Fletcher Rd.	Upper Mount Albion Rd.	760	675	$1,742,000			$0	$1,742,000	$0	$0		0-5		x		
SCU10-S-09	Highland Rd. W	400 m south of Highland Rd. on Upper Mount Albion Rd.	Existing sewer east of Upper Mount Albion Rd. at MH SA17A045	790	375	$912,000			$0	$912,000	$0	$0		0-5		x		
SCU12-S-09	Upper Centennial Trunk Sewer	Swayze Rd	King St.	6100	1200	$70,120,000			$0	$70,120,000	$0	$0		King to Green Mtn - under construction, Green Mtn to Swayze - 2013		x		
SCU14-S-09	Properties east of First Rd. W and north of Green Mountain Rd. - Nash Neighbourhood	Connection to Centennial Trunk Sewer				$6,000,000			$0	$6,000,000	$0	$0		0-5		x	x	
SCU15-S-09	Upper Centennial Trunk Sewer	Golf Club Rd	Swayze Rd	1533	1200	$17,622,000			$0	$17,622,000	$0	$0		0-6		x		
Total Stoney Creek Upper (0 to 5 Years)						**$101,172,000**			**$0**	**$101,172,000**	**$0**	**$0**						

Table E2.6b Stoney Creek Upper Sanitary Sewage System Development Charges Works (Planning Period - 6 Years to UBBO)

	Project/Street	From	To	Length (m)	Size (mm)	Estimated Total Cost ($2011)	Benefit to Existing	Oversizing	Direct Developer Contribution ($2011)	Development Charges ($2011)	Post Period Benefit ($2011)	Benefit to Existing ($2011)	Amount already funded from DC Reserve	City of Hamilton Timing Estimate	Updated Budget Cost/ Actual	Engineering Benchmarks Adjustments	Scope Change	Project Added
SCU11-S-09	Elfrida Collection Network					$23,647,000			$7,804,000	$15,843,000	$0	$0		10+		X		
Total Stoney Creek Upper (6 Years to UBBO)						**$23,647,000**			**$7,804,000**	**$15,843,000**	**$0**	**$0**						

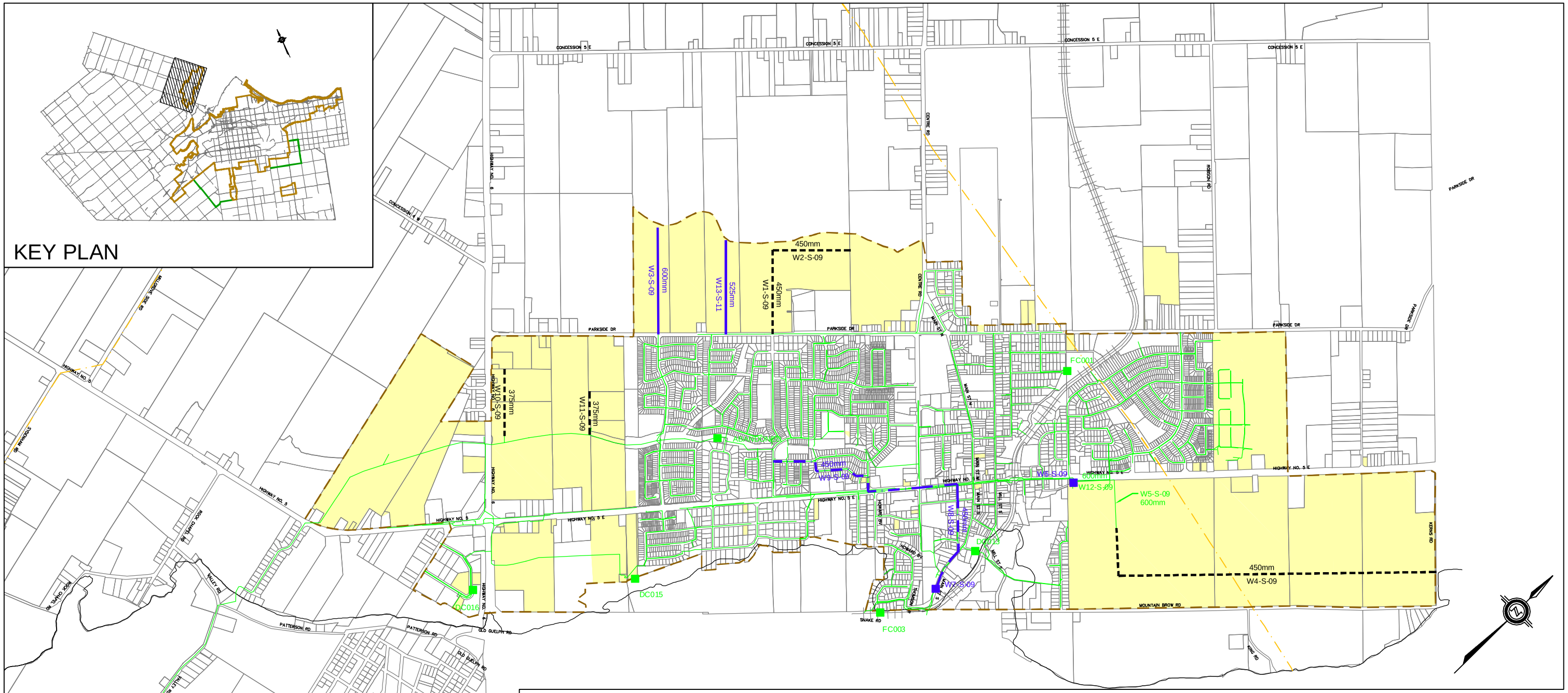
Table E2.7a Stoney Creek Lower Sanitary Sewage System Development Charges Works (Planning Period - 0 to 5 Years)

Project ID	Project/Street	From	To	Length (m)	Size (mm)	Estimated Total Cost ($2011)	Benefit to Existing	Oversizing	Direct Developer Contribution ($2011)	Development Charges ($2011)	Post Period Benefit ($2011)	Benefit to Existing ($2011)	Amount already funded from DC Reserve	City of Hamilton Timing Estimate	Updated Budget Cost/ Actual	Engineering Benchmarks Adjustments	Scope Change	Project Added
SCL1-S-09	South Service Rd	Fifty Road	Oriole Ave	700	600	$1,304,178			$591,730	$712,448	$0	$0		0-5	X		X	
SCL2-S-09	Forcemain- South Service Rd.	P. S.	Fifty Rd.	450	150	$350,000			$0	$350,000	$0	$0		0-5	X		X	
SCL3-S-09	New Sewage Pumping Station at South Service Rd./Fifty Rd.					$300,000			$0	$300,000	$0	$0		0-5	X			
SCL12-S-09	HC056 - Green Rd Upgrades - Install 3 new pumps (100 L/s each)					$946,000			$0	$946,000	$0	$0		0-5		X		
SCL13-S-09	HC056 - Green Rd FM Twinning	Green Rd SPS	SF03A011	10	300	$118,000			$0	$118,000	$0	$0		0-5		X		
SCL14-S-09	South Service Rd	Fifty Road	627 m east	382	375	$261,414			$130,707	$130,707	$0	$0		0-5	X		X	
SCL15-S-09	South Service Rd	Winona Rd	Service Rd, 200 m east of Winona Rd			$0			$0	$0	$0	$0		Project Consolidated with SCL1-S-09	X		X	
SCL11-S-09	Centennial Trunk Sewer	King St	ESI @ Kenora Ave	3510	1500	$15,457,000			$0	$15,457,000	$0	$0		0-5		X		
SCL16-S-11	SCUBE Additional Internal Servicing					$2,000,000			$0	$2,000,000	$0	$0		0-5				X
Total Stoney Creek Lower (0 to 5 Years)						**$20,736,592**			**$722,437**	**$20,014,155**	**$0**	**$0**						

Table E2.7b Stoney Creek Lower Sanitary Sewage System Development Charges Works (Planning Period - 6 Years to UBBO)

Project ID	Project/Street	From	To	Length (m)	Size (mm)	Estimated Total Cost ($2011)	Benefit to Existing	Oversizing	Direct Developer Contribution ($2011)	Development Charges ($2011)	Post Period Benefit ($2011)	Benefit to Existing ($2011)	Amount already funded from DC Reserve	City of Hamilton Timing Estimate	Updated Budget Cost/ Actual	Engineering Benchmarks Adjustments	Scope Change	Project Added
SCL10-S-09	North Service Road	Millen Rd.	Dewitt Rd.	900	250	$964,000			$482,000	$482,000	$0	$0		6-10		X		
Total Stoney Creek Lower (6 Years to UBBO)						**$964,000**			**$482,000**	**$482,000**	**$0**	**$0**						

KEY PLAN



LEGEND

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- PUMPING STATION EXISTING
- SANITARY SEWER 0 – 5 YEARS
- FORCEMAIN 0 – 5 YEARS
- PUMPING STATION 0 – 5 YEARS
- SANITARY SEWER 6 PLUS YEARS
- FORCEMAIN 6 PLUS YEARS
- PUMPING STATION 6 PLUS YEARS
- SEWER–100% DIRECT DEVELOPMENT CONTRIBUTION
- DEVELOPMENT AREAS
- GROWTH BOUNDARY UNDER GRIDS
- URBAN BOUNDARY

DRAFT

Hamilton Development Charges Background Study

Figure E2-1
Waterdown Sanitary Sewer

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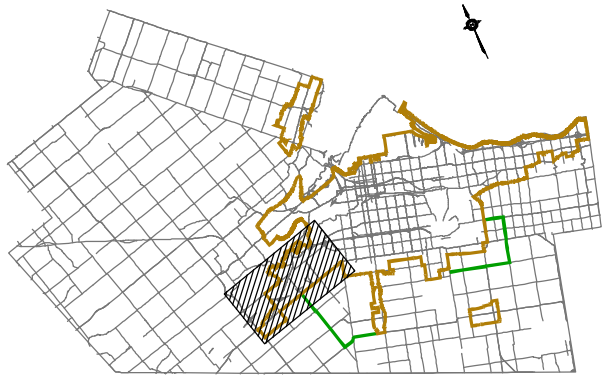

LEGEND

- SANITARY SEWER EXISTING
- PUMPING STATION EXISTING
- SANITARY SEWER 0 – 5 YEARS
- FORCEMAIN 0 – 5 YEARS
- PUMPING STATION 0 – 5 YEARS
- SANITARY SEWER 6 PLUS YEARS
- FORCEMAIN 6 PLUS YEARS
- PUMPING STATION 6 PLUS YEARS
- SEWER–100% DIRECT DEVELOPMENT CONTRIBUTION
- DEVELOPMENT AREAS
- GROWTH BOUNDARY UNDER GRIDS
- URBAN BOUNDARY

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Hamilton Development Charges Background Study

Figure E2-2

Ancaster

Sanitary Sewer

DATE: MARCH 2011
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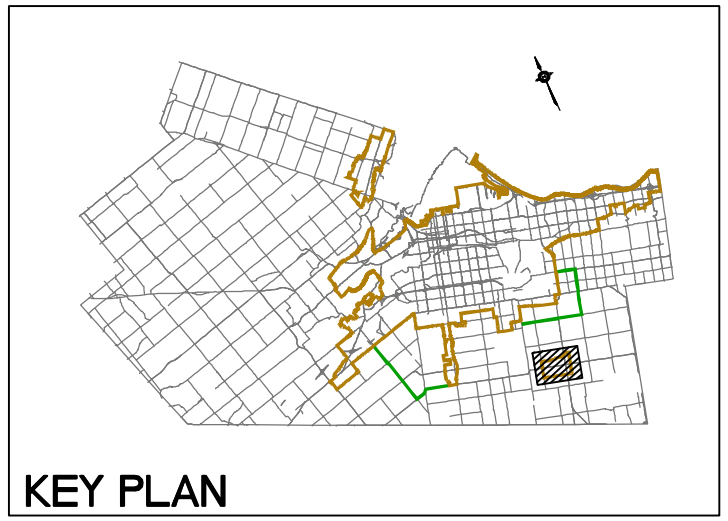
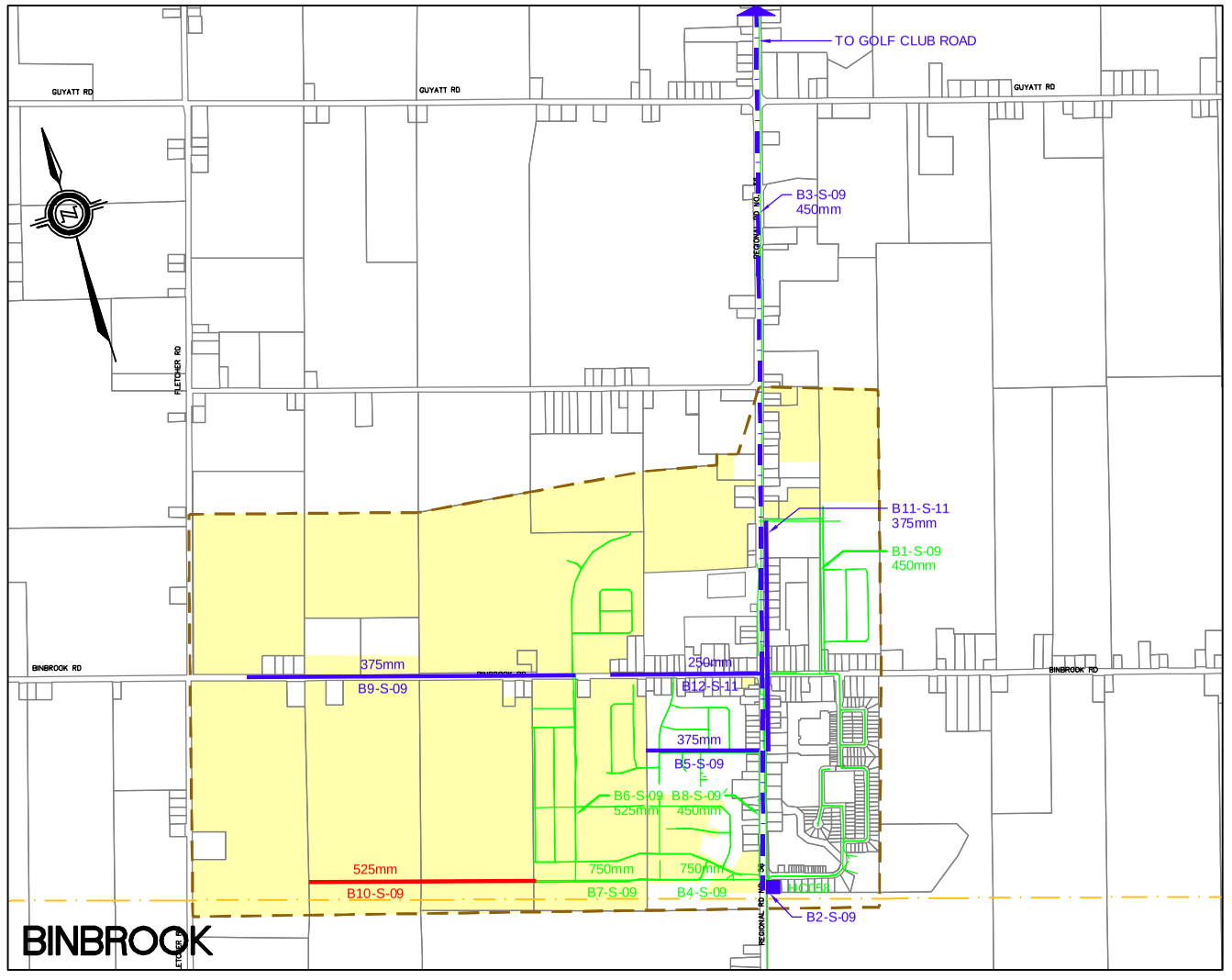


LEGEND

- SANITARY SEWER EXISTING
- PUMPING STATION EXISTING
- SANITARY SEWER 0 – 5 YEARS
- FORCEMAIN 0 – 5 YEARS
- PUMPING STATION 0 – 5 YEARS
- SANITARY SEWER 6 PLUS YEARS
- FORCEMAIN 6 PLUS YEARS
- PUMPING STATION 6 PLUS YEARS
- SEWER–100% DIRECT DEVELOPMENT CONTRIBUTION
- DEVELOPMENT AREAS
- GROWTH BOUNDARY UNDER GRIDS
- URBAN BOUNDARY



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Hamilton Development Charges Background Study

Figure E2-3

Binbrook Sanitary Sewer

E-50

DATE: MARCH 2011
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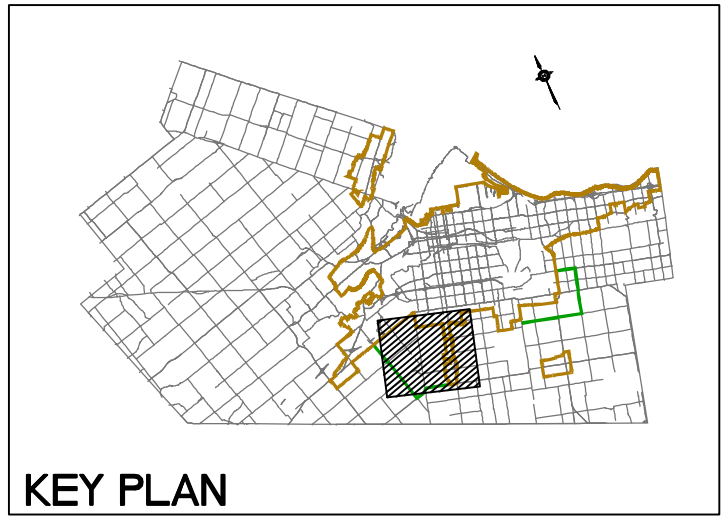
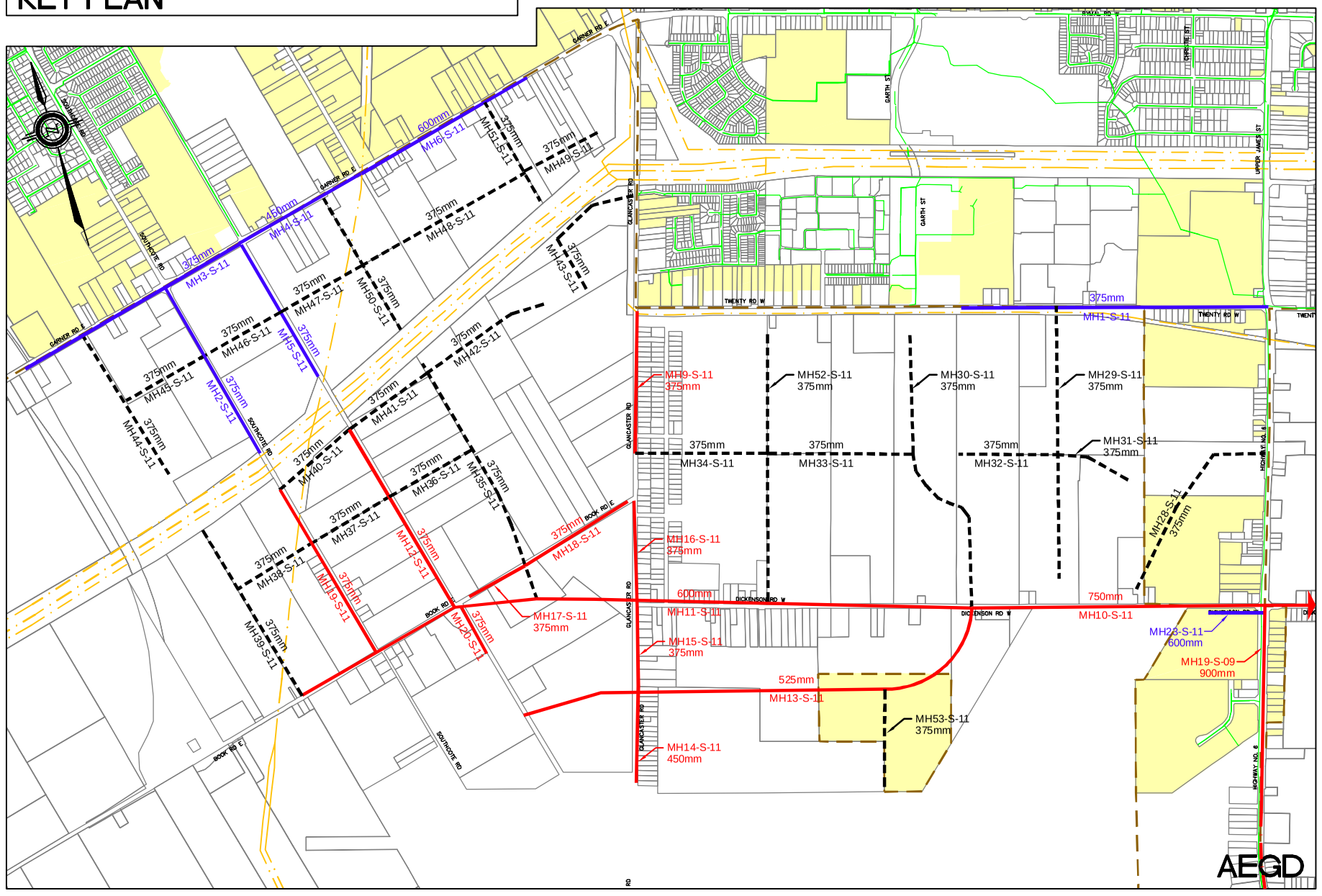
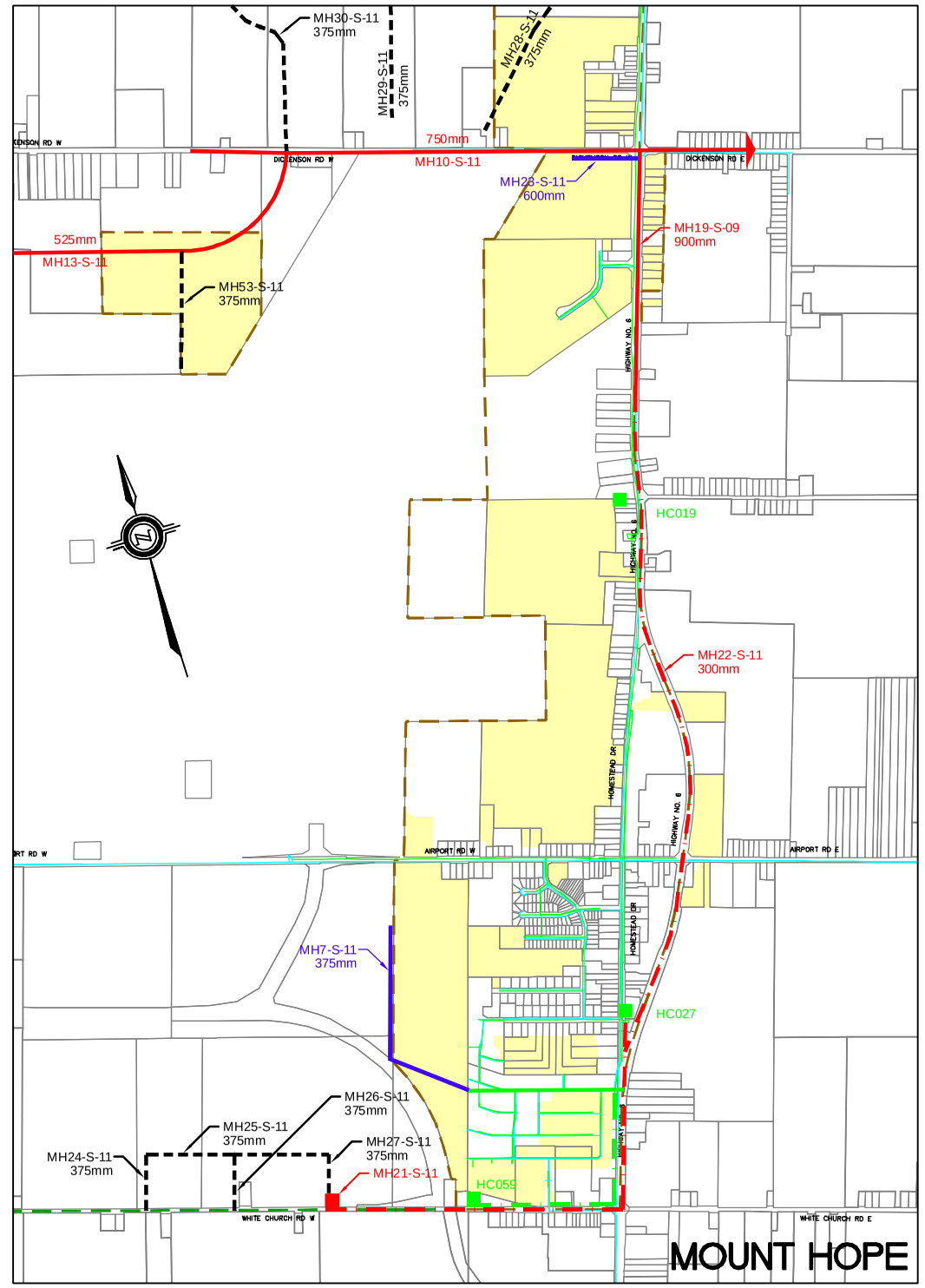


LEGEND

- SANITARY SEWER EXISTING
- PUMPING STATION EXISTING
- SANITARY SEWER 0 – 5 YEARS
- FORCEMAIN 0 – 5 YEARS
- PUMPING STATION 0 – 5 YEARS
- SANITARY SEWER 6 PLUS YEARS
- FORCEMAIN 6 PLUS YEARS
- PUMPING STATION 6 PLUS YEARS
- SEWER–100% DIRECT DEVELOPMENT CONTRIBUTION
- DEVELOPMENT AREAS
- GROWTH BOUNDARY UNDER GRIDS
- URBAN BOUNDARY





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Hamilton Development Charges Background Study

Figure E2-4

AEGD / Mount Hope Sanitary Sewer

E-51

DATE: MARCH 2011
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KEY PLAN

LEGEND

- SANITARY SEWER EXISTING
- PUMPING STATION EXISTING
- SANITARY SEWER 0 – 5 YEARS
- FORCEMAIN 0 – 5 YEARS
- PUMPING STATION 0 – 5 YEARS
- SANITARY SEWER 6 PLUS YEARS
- FORCEMAIN 6 PLUS YEARS
- PUMPING STATION 6 PLUS YEARS
- SEWER–100% DIRECT DEVELOPMENT CONTRIBUTION
- DEVELOPMENT AREAS
- GROWTH BOUNDARY UNDER GRIDS
- URBAN BOUNDARY

HM24-S-09 250mm
HM23-S-09 250mm
300mm HM1-S-09
375mm HM2-S-09
HM3-S-09 375mm
HM14-S-09 375mm
HM25-S-09 375mm
HM15-S-09 375mm
HM16-S-09 375mm
HM13-S-09 375mm
HM10-S-09 375mm
HM9-S-09 375mm
HM7-S-09 600mm
HM18-S-09 250mm
HM17-S-09
HC018
450mm HM12-S-09
HM11-S-09 375mm
HM8-S-09 375mm
HM6-S-09 525mm
HM4-S-09 450mm
HM5-S-09 450mm
HM26-S-09 900mm
900mm HM20-S-09
HM19-S-09 900mm
HM21-S-09
HM22-S-09 600mm

Stoney Creek Upper - See Figure E2-6

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Hamilton Development Charges Background Study

Figure E2-5
Hamilton Mountain Sanitary Sewer

E-52

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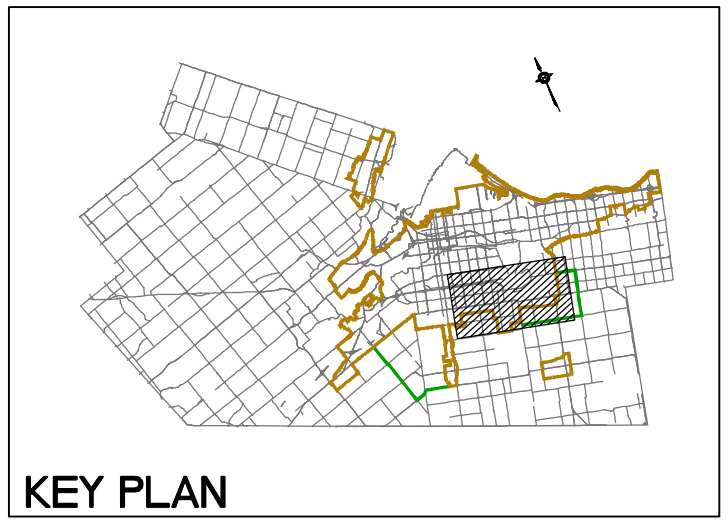

LEGEND

- SANITARY SEWER EXISTING
- PUMPING STATION EXISTING
- SANITARY SEWER 0 – 5 YEARS
- FORCEMAIN 0 – 5 YEARS
- PUMPING STATION 0 – 5 YEARS
- SANITARY SEWER 6 PLUS YEARS
- FORCEMAIN 6 PLUS YEARS
- PUMPING STATION 6 PLUS YEARS
- SEWER–100% DIRECT DEVELOPMENT CONTRIBUTION
- DEVELOPMENT AREAS
- GROWTH BOUNDARY UNDER GRIDS
- URBAN BOUNDARY

Hamilton Development Charges Background Study

Figure E2-6
Stoney Creek Upper Sanitary Sewer

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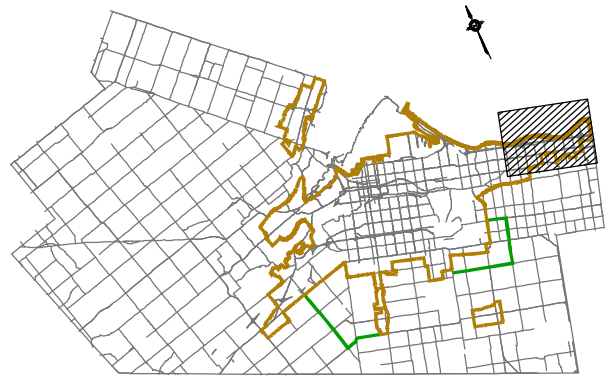

KEY PLAN

LEGEND

- SANITARY SEWER EXISTING
- PUMPING STATION EXISTING
- SANITARY SEWER 0 – 5 YEARS
- FORCEMAIN 0 – 5 YEARS
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- SANITARY SEWER 6 PLUS YEARS
- FORCEMAIN 6 PLUS YEARS
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- SEWER–100% DIRECT DEVELOPMENT CONTRIBUTION
- DEVELOPMENT AREAS
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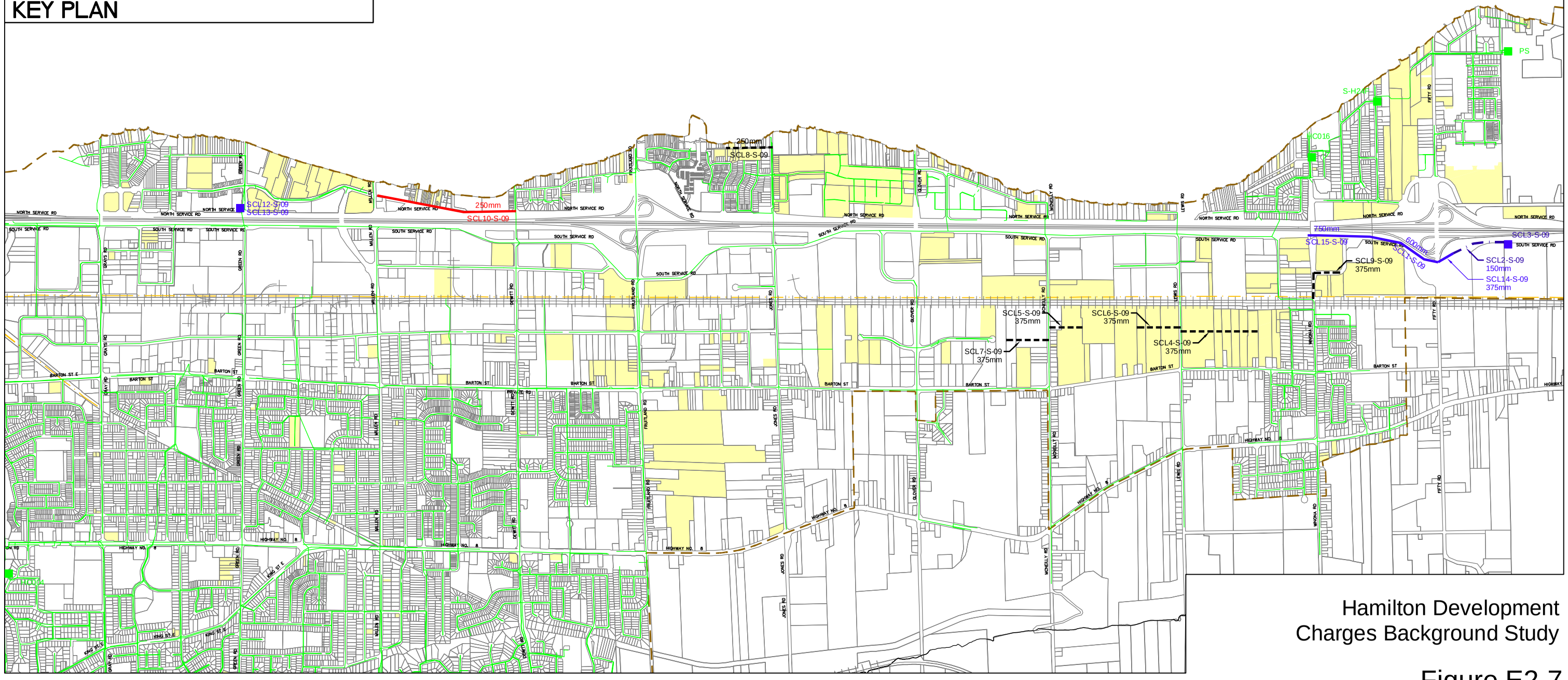

Hamilton Development Charges Background Study

Figure E2-7
Stoney Creek Lower Sanitary Sewer

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DATE: MARCH 2011
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ATTACHMENT C

CITY-WIDE WATER/WASTEWATER PROJECTS

Table E3a City Wide Water/Wastewater System (Planning Period - 0 to 5 Years)

Project ID	Project	Location	Description	Estimated Total Cost ($2011)	City Cost			Direct Developer Contribution	Development Charges			Post Period Benefit	Updated Budget Cost/ Actual	Engineering Benchmarks Adjustments	Scope Change	Project Added
					Sanitary	Water	Total		Sanitary	Water	Total					
CW1-W-09	Oversizing of Infrastructure-Watermains	City Wide	Oversizing of servicing infrastructure within subdivisions	$261,250	$0	$0	$0	$0	$0	$261,250	$261,250			X		
CW2-W-09	Regional Subdivider's Share for Local Improvements	City Wide		$6,291,332	$0	$0	$0	$0	$5,300,447	$990,885	$6,291,332			X		
CW3-W-09	Intensification Infrastructure Upgrades - Water (0-5 years)	City Wide	Upgrades to existing infrastructure to accommodate intensification	$2,090,000	$0	$1,045,000	$1,045,000	$0	$0	$1,045,000	$1,045,000			X		
CW5-W-09	HD12A Governor's Rd Pumping Station Upgreades	City Wide	Additional pumping capacity new pump and new standby power (3ML/d)	$2,482,954	$0	$0	$0	$0	$0	$2,482,954	$2,482,954			X		
CW6-W-09	Governor's Rd PD 11 Watermain Extension	City Wide	Twin Watermain feeding HD12A (220 m 400mm)	$236,472	$0	$0	$0	$0	$0	$236,472	$236,472			X		
CW7-W-09	Governor's Rd PD 22 Watermain Extension	City Wide	New watermain from HD12A to PD22 on Governor's Rd and Moss Blvd (1000m 300 mm)	$827,651	$0	$0	$0	$0	$0	$827,651	$827,651			X		
CW9-W-09	HD002 Ferguson Pumping Station Upgrades (Standby Power)	City Wide	New Standby Power (1000kW)	$1,773,538	$0	$1,170,535	$1,170,535	$0	$0	$603,003	$603,003			X		
CW10-W-09	HD012 Lynden Ave Pumping Station Upgrades	City Wide	Additional pumping capacity and standby power (3 Ml/d)	$2,482,954	$0	$0	$0	$0	$0	$2,482,954	$2,482,954			X		
CW12-W-11	Woodward WTP	City Wide	Sedimentation Tank and Pre-Chlorination Upgrades (MP W-17 & W-18)	$21,004,800			$0			$21,004,800	$21,004,800					X
CW14-W-11	Oversizing of Infrastructure-Watermains	City Wide	Oversizing of servicing infrastructure for subdivisions not identified on draft plans	$6,200,000	$0	$0	$0	$0	$0	$6,200,000	$6,200,000					X
CW1-S-09	Flow Monitoring	City Wide	Total cost over a period of 2 - 2.5 years. Study being undertaken to know various flow characteristics to calibrate the Sanitary Sewer Model to assist the Master Planning Study	$2,090,000	$1,045,000	$0	$1,045,000	$0	$1,045,000	$0	$1,045,000			X		
CW2-S-09	I/I Reduction Program	City Wide	Program to free up extra capacity within the existing sewers - costs over five years	$2,612,500	$1,306,250	$0	$1,306,250	$0	$1,306,250	$0	$1,306,250			X		
CW3-S-09	Annual Operational Improvements Outstations, 5160067052	City Wide	Operational improvements to wastewater outstations to increase capacities.	$522,500	$130,625	$0	$130,625	$0	$391,875	$0	$391,875			X		
CW4-S-09	Oversizing of Infrastructure-Sanitary	City Wide	Oversizing of servicing infrastructure within subdivisions	$522,500	$0	$0	$0	$0	$522,500	$0	$522,500			X		
CW5-S-09	Land requirement for new sewage pumping stations and easements	City Wide	Areas for SPS footprints and easements- 5 Ha	$522,500	$0	$0	$0	$0	$522,500	$0	$522,500			X		
CW6-S-09	Intensification Infrastructure Upgrades - Wastewater (0-5 years)	City Wide	Upgrades to existing infrastructure to accommodate intensification	$2,090,000	$1,045,000	$0	$1,045,000	$0	$1,045,000	$0	$1,045,000			X		
CW8-S-09	Ancaster Fennell Trunk Sewer Twinning	City Wide	900mm 400m	$945,887	$0	$0	$0	$0	$945,887	$0	$945,887			X		
CW9-S-09	Ancaster Fennell Trunk Sewer Twinning	City Wide	1050mm 500m	$1,418,831	$0	$0	$0	$0	$1,418,831	$0	$1,418,831			X		
CW10-S-09	Ancaster Fennell Trunk Sewer Twinning	City Wide	1200mm 1500m	$4,611,200	$0	$0	$0	$0	$4,611,200	$0	$4,611,200			X		
CW11-S-09	Ancaster Fennell Trunk Sewer Twinning	City Wide	1350mm 300m	$1,064,123	$0	$0	$0	$0	$1,064,123	$0	$1,064,123			X		
CW12-S-09	West 18th St Sewer Twinning	City Wide	525mm 2000m	$3,901,785	$0	$0	$0	$0	$3,901,785	$0	$3,901,785			X		
CW13-S-09	Scenic Dr sewer twinning	City Wide	750mm 500m	$1,537,067	$0	$0	$0	$0	$1,537,067	$0	$1,537,067			X		
CW14-S-09	Bowman St sewer twinning	City Wide	900mm 500m	$1,182,359	$0	$0	$0	$0	$1,182,359	$0	$1,182,359			X		
CW15-S-09	Hwy 403 Trunk sewer twinning - Phase 1	City Wide	MIP to Main-King	$7,533,582	$0	$0	$0	$0	$7,533,582	$0	$7,533,582			X		
CW18-S-11	Oversizing of Infrastructure-Sanitary	City Wide	Oversizing of servicing infrastructure for subdivisions not identified on draft plans	$1,000,000	$0	$0	$0	$0	$1,000,000	$0	$1,000,000					X
Total City Wide Projects (0 to 5 Years)				**$75,205,784**	**$3,526,875**	**$2,215,535**	**$5,742,410**	**$0**	**$33,328,405**	**$36,134,969**	**$69,463,374**	**$0**				

Table E3b City Wide Water/Wastewater System (Planning Period - 6 Years to UBBO)

Project ID	Project	Location	Description	Estimated Total Cost ($2011)	City Cost			Direct Developer Contribution	Development Charges			Post Period Benefit	Updated Budget Cost/ Actual	Engineering Benchmarks Adjustments	Scope Change	Project Added
					Sanitary	Water	Total		Sanitary	Water	Total					
CW4-W-09	Intensification Infrastructure Upgrades - Water	City Wide	Upgrades to existing infrastructure to accommodate intensification	$8,360,000	$0	$4,180,000	$4,180,000	$0	$0	$4,180,000	$4,180,000			X		
CW7-S-09	Intensification Infrastructure Upgrades - Wastewater	City Wide	Upgrades to existing infrastructure to accommodate intensification	$8,360,000	$4,180,000	$0	$4,180,000	$0	$4,180,000	$0	$4,180,000			X		
CW11-W-09	Locke St Watermain	City Wide	Locke St from Barton St to Main St (1500 m 400mm)	$1,655,303	$0	$0	$0	$0	$0	$1,655,303	$1,655,303			X		
CW13-W-11	Cut in Valves on trunk Watermains	City Wide		$1,000,000	$0	$1,000,000	$1,000,000	$0	$0	$0	$0					X
CW16-S-09	Hwy 403 Trunk sewer twinning - Phase 2	City Wide	Royal CSO to MIP	$6,536,490	$0	$0	$0	$0	$6,536,490	$0	$6,536,490			X		
CW17-S-09	HC002 Scenic Dr SPS Upgrades	City Wide	Install third pump (57 L/s)	$236,472	$0	$0	$0	$0	$236,472	$0	$236,472			X		
Total City Wide Projects (6 Years to UBBO)				**$26,148,264**	**$4,180,000**	**$5,180,000**	**$9,360,000**	**$0**	**$10,952,961**	**$5,835,303**	**$16,788,264**	**$0**				

ATTACHMENT D

WOODWARD AVE WWTP ADDITIONAL INFORMATION

CITY OF HAMILTON
2011-2035 CAPITAL BUDGET PROJECT DETAIL SHEET

Division/Department:: Wastewater System - Public Works Rate Funded **Project ID:** 5160866801 **Category:** Wastewater Investment Needs (WINS)

Project Name: Woodward Wastewater Treatment Plant Expansion **Ward (s):** City Wide

Objectives:

As a result of the Water and Wastewater Master Plan, this Woodward Expansion Program is required to accommodate future growth demands as well as improve water quality to meet the Hamilton Harbour Remedial Action Plan (HHRAP) for delisting Hamilton Harbour as an Area of Concern with the International Joint Commission. Several sub-projects are being phased in over 9 years which include a new tertiary MBR treatment process, new wastewater pumping station, upgrades and expansion to the existing electrical system and new chlorine contact tank, outfall and upgrades to the Red Hill Creek. All projects will be constructed at the Woodward wastewater treatment plant and be coordination as part of this Woodward Expansion Program and includes the ISF 660-Biogas Digester (Energy Recovery) and Primary Treatment Capacity Expansion Projects. Please note that this Capital Detail sheet represents 3 separate sheets in the City's 2011-2031 Rate Capital Forecast (Pages 137,138 and 141). The figures and the timing are an amalgam of these 3 submissions adjusted for updated cost and revenue information.

Status:

Capital Budget Initiation: 2008
Start Date: 2008
Completion Date: 2019
Tangible Capital Asset: Yes

Expense	Total	Pre 2011	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021-35
Construction	710,247	51,347	50,100	15,200	20,400	20,400	3,100		155,700	204,500	89,500		100,000
Design	52,600	27,000				3,100	5,100	8,100	3,100	3,100	3,100		
Total Expense	762,847	78,347	50,100	15,200	20,400	23,500	8,200	8,100	158,800	207,600	92,600	0	100,000

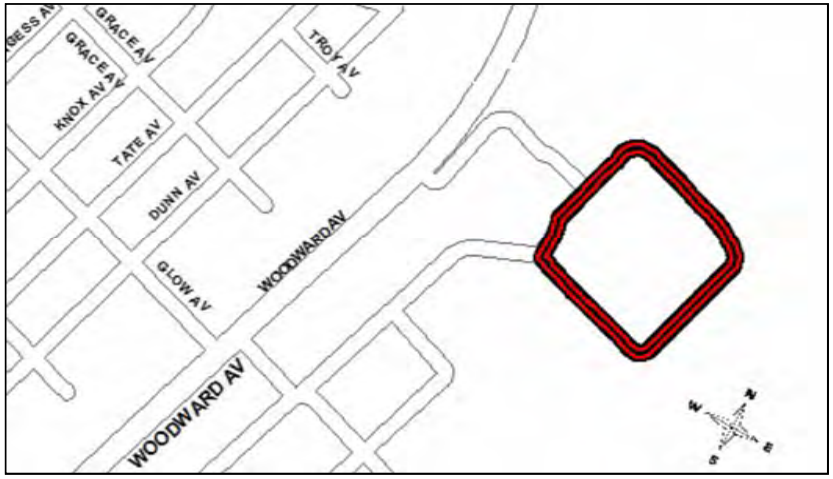
Revenue	Total	Pre 2011	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021-35
Dev Charges - Non-Res 31%	103,757		2,757						31,000	30,000	23,290		16,710
Dev Charges - Res 69%	230,943	0	8,313	1,862					69,000	69,000	54,918		27,850
Federal/Prov Grants/Subsidies	160,185	39,174	25,050	10,138	13,607	15,675	5,469	5,403	45,670	0	0		
From Operating Fund	91,700		1,700							90,000			
From WIP Transfers	30,323	27,773	2,550										
Total Revenue	616,908	66,947	40,370	12,000	13,607	15,675	5,469	5,403	145,670	189,000	78,208	0	44,560
Net Cost	145,939	11,401	9,730	3,200	6,793	7,826	2,731	2,697	13,130	18,600	14,392	0	55,440

Operating Budget Impact:

	2011	2012	2013 onward
Costs(Savings)			14,600
Staffing Impacts (F.T.E.)			0.00

Project Rating Attributes

(Project Justification):	Weight	Rating (1-10)	Weighted Rank
Contractual/Legislated Obligations			
Health and Safety			
Operating Budget/Financial Impact			
Strategic Direction (Dominant Project Theme)			



DC Study Costing - 2009 DC Report

Process	Total As per 2008$	Total As per 2009$	Federal	Provincial	Net after Grant Funding 2009$
Raw Wastewater Pumping	$48,300,000	$52,936,800			$52,936,800
Primary Treatment/Bypass Chlorine Contact Tank	$44,400,000	$48,662,400			$48,662,400
North and South Secondary Treatment Plant Upgrades	$25,180,000	$27,597,280			$27,597,280
New Secondary/Tertiary Treatment Plant	$348,000,000	$381,408,000			$381,408,000
Secondary/Tertiary Chlorine contact Tank	$7,600,000	$8,329,600			$8,329,600
New WAS Thickening Facility	$15,890,000	$17,415,440			$17,415,440
New Outfall	$5,000,000	$5,480,000			$5,480,000
	$494,370,000	$541,829,520	$0	$0	$541,829,520
Additional Dewatering Capacity	$7,950,000	$8,713,200			$8,713,200
Refurbishment of Digesters to Increase Capacity	$13,500,000	$14,796,000			$14,796,000
Biosolids Thermal Reduction Disposal Facility	$90,000,000	$98,640,000			$98,640,000
	$111,450,000	$122,149,200	$0	$0	$122,149,200
New Electrical and power systems	$69,300,000	$75,952,800			$75,952,800
Total as per 2009 DC Study	**$675,120,000**	**$739,931,520**	**$0**	**$0**	**$739,931,520**
Growth Costs				**49%**	**$360,715,520**
Non-Growth Costs				**51%**	**$379,216,000**

DC Study Costing for 2011 Report

Project Number	Process	Total As per 2011$	Federal	Provincial	Net After Grants
1	Raw Wastewater Pumping	$54,100,000	$0	$0	$54,100,000
2a	Primary Treatment (Phase 1 - CEPT) - Engineering Included	$16,255,669	$5,012,764	$182,282	$11,060,623
2b	Primary Treatment (Phase 2 - Tanks) - Including Engineering	$52,486,549	$17,495,341	$17,495,341	$17,495,866
3	North and South Secondary Treatment Plant Upgrades	$0	$0	$0	$0
4a	New Secondary/Tertiary Treatment Plant (Phase 1)	$302,316,300	$0	$100,000,000	$202,316,300
4b	New Secondary/Tertiary Treatment Plant (Phase 2)	$75,731,760	$0	$0	$75,731,760
5	Secondary/Tertiary Chlorine contact Tank, Outfall and Red Hill Creek Upgrades	$36,644,400	$0	$0	$36,644,400
6	New WAS Thickening Facility	$0	$0	$0	$0
7	New Outfall	$0	$0	$0	$0
8	Engineering (Projects 1, 4a, 4b, 5, 13)	$43,570,793	$0	$0	$43,570,793
9	Additional Dewatering Capacity	$0	$0	$0	$0
10	Refurbishment of Digesters to Increase Capacity	$0	$0	$0	$0
11	Biogas Digester				
	Phase 1	$42,000,000	$10,000,000	$10,000,000	$22,000,000
	Phase 2	$7,500,000	$0	$0	$7,500,000
12	Biosolids Thermal Reduction Disposal Facility	$73,000,000	$0	$0	$73,000,000
13	New Electrical and power systems	$59,241,780	$0	$0	$59,241,780
	Total 2011 Costing	**$762,847,251**	**$32,508,105**	**$127,677,623**	**$602,661,522**
Growth Costs				**49%**	**$295,304,146**
Non-Growth Costs				**51%**	**$307,357,376**

Note all cost include City's portion of HST

Total Difference Between 2009 and 2011	**$22,915,731**	**$32,508,105**	**$127,677,623**	**($137,269,998)**

AECOM

City of Hamilton

Woodward Avenue WWTP

Development Charges Update

REPORT

Prepared by:

AECOM
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F: 905.459.7869

Project No.: 2881

Date: November 13, 2008

AECOM

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List of Tables

1.0 Introduction

1.1 Background

The City of Hamilton passed a Development Charges By-law in 2004. The 2004 DC By-law was based on infrastructure needs required to support growth estimates out to year 2024 developed at that time. The infrastructure needs were outlined in the DC Background Study.

Since the adoption of the DC By-law, there have been updates to the scope and cost estimates for key infrastructure projects identified the DC Background Study.

A significant project that is required to support wastewater servicing for existing users and future development is the upgrade and expansion of the Woodward Avenue Wastewater Treatment Plant (WWTP).

The City of Hamilton completed a Scoping Study that examined conceptual requirements and a cost basis for upgrading the Woodward Avenue WWTP to meet current and anticipated performance, and expanding the plant to provide capacity for future growth (CH2M HILL, 2005). A report prepared for the City (KMK[1], 2007) presented proposed growth and non-growth related charges for these projects, using costs presented in the Scoping Study, to support the 2007 update of the development charges.

In November 2006 (KMK, 2006), the City of Hamilton completed a Water and Wastewater Master Plan and in March 2008 (KMK, 2008), the City completed Phases 3 and 4 of the Schedule C Class Environmental Assessment (EA) to plan for the expansion and upgrade of the Woodward Avenue WWTP. The Master Plan reviewed and updated the long term water and wastewater servicing strategies. From the Master Plan and Class EA, cost estimates for key infrastructure projects updated and new infrastructure projects were identified. For the Woodward Avenue WWTP, capital cost estimates have been further updated after the conceptual design was refined. This information is now being used to update a term capital program and provide background information for the future review and update to the Development Charges By-law for the City.

As part of the current DC update, an review and revision of the 2007 assessment of the Woodward Avenue WWTP upgrade and expansion was undertaken to identify growth and non-growth related costs. Specifically, the 2007 report was based on updated estimates from the 2005 Scoping Study. This report, which has been prepared to present the updated costs, is based on the recommended design concept in the Class EA Phases 3 and 4 study and most recent refined cost estimates.

In parallel with the above work, the City also completed a Biosolids Master Plan. That study identified a preferred solution for long term biosolids management at the Woodward Avenue WWTP. The Class EA Phases 3 and 4 study to develop the preferred conceptual design for the Master Plan is being completed (by AECOM). Updated costs have been developed based on refinement of the Master Plan recommendations.

This report presents the results of the analysis of the Woodward Avenue WWTP capital cost for upgrade and expansion, the recommended growth and non-growth cost allocations and the rationale for the recommended allocations.

[1] Formerly KMK Consultants Limited, now AECOM (since October 6, 2008).

2.0 Basis for Determining Expansion and Upgrade Requirements

2.1 Growth

The growth projections and wastewater flow calculations used for the design basis for the Woodward Avenue WWTP expansion are presented in Table 1. Expansion of the plant from its current capacity of 409 ML/d to a capacity of 500 ML/d will be required to service growth for the 2031 planning period.

Table 1 Service Population and Flow Projections[1]

	Current	Rated Capacity	2021	2024	2031
Serviced Population (1)	451,958	500,596	557,693	583,856	636,353
Design Flow (ML/d)	347	409	436	448	500

Note:
1. Source: City of Hamilton Water and Wastewater Master Plan, 2006.

It is projected that the existing capacity will be reached by 2011, and by that time, additional capacity will be in place. This is consistent with the City of Hamilton Water and Wastewater Master Plan Policy Paper under Policy G.07 that the City shall "maintain sufficient reserve capacity in its water and wastewater infrastructure and facilities" and schedule future expansions accordingly.

2.2 Performance Criteria

The level of treatment required for the expanded and upgraded Woodward Avenue WWTP was determined based on a review of current Ontario Ministry of the Environment (MOE) policies and protocol, and from consultation with the MOE during the Master Plan and Class EA Phase 3 and 4 study (KMK, 2008).

In order to evaluate the non-growth and growth cost allocation, the level of upgrades was evaluated based on the following:

- Upgrade existing plant: If the existing plant would not be expanded, the City of Hamilton would maintain the 409 ML/d capacity, and implement upgrades to bring the plant performance up to current standards, which are similar to other wastewater treatment plants with Lake-based discharges.
- Expand plant to 2031 capacity of 500 ML/d: With expansion of the plant to the 2031 capacity, a new Certificate of Approval will be required. To support an application for the increased capacity, the Ontario Ministry of the Environment (MOE) will consider the assimilative capacity of the Harbour, and will impose corresponding effluent criteria to protect the water quality. From discussions with the MOE through the Master Plan and Class EA process, a higher level of ammonia removal and tertiary phosphorus removal will be required..

Table 2 presents the current level of treatment, and upgrade requirements and rationale and/or basis for the anticipated upgrade.

Table 2 Performance Criteria

Treatment Component	Current	Upgrade 409 ML/d[1]	2031 Upgrade	Basis
Peak hour capacity factor (i.e., peak capacity/average capacity)	1.5	2.0	2.0	Flow increases during wet weather due to inflow, infiltration and in Hamilton, combined sewers. A peak factor of 2.0 is a typical design basis for large Ontario plants[2], to minimize bypasses of raw or partially treated wastewater during wet weather.
Effluent ammonia-nitrogen concentration	No limit	5 mg/L (summer) 10 mg/L (winter)	<2 mg/L (summer) <5 mg/L (winter)	MOE policy requires non-toxic effluent with respect to ammonia at the end-of-pipe, with typical design objectives of 5 mg/L (summer) and 10 mg/L (winter). [2] With increase flow (from expanded plant) and sensitivity of Hamilton Harbour, more stringent effluent criteria are anticipated with expansion.
Effluent phosphorus concentration	0.8 mg/L	0.6 to 0.8 mg/L	0.15 mg/L	Typical design objectives for Lake-based plants are in the range of 0.6 to 0.8 mg/L.[2] With increase flow (from expanded plant) and sensitivity of Hamilton Harbour, more stringent effluent criteria are anticipated with expansion.

Notes:

1. Upgrades that would be implemented if there were to be no expansion (i.e., allocated to existing ratepayers)
2. Examples include Lakeview WWTP (448 ML/d), Clarkson WWTP (200 ML/d), Mid-Halton WWTP (75 ML/d) and Duffin Creek WWTP (620 ML/d) all undergoing expansion within last 5 years.

3.0 Expansion and Upgrade Requirements and Costs

3.1 Expansion and Upgrade Requirements

Table 3 presents the specific expansion and upgrade requirements, and 2008 capital cost estimates, to achieve the 2031 capacity as identified in the Woodward Avenue WWTP Class EA documentation.

Table 3 Specific Upgrade and Expansion Requirements

Process	Capital Cost in 2008 Dollars
Wastewater Treatment Process Expansions and Upgrades	
Raw Wastewater Pumping	$48,300,000
Primary Treatment/ Bypass Chlorine Contact Tank	$44,400,000
North and South Secondary Treatment Plant Upgrades	$25,180,000
New Secondary/Tertiary Treatment Plant	$348,000,000
Secondary/Tertiary Chlorine Contact Tank	$7,600,000
New WAS Thickening Facility	$15,890,000
New Outfall	$5,000,000
Total for Wastewater Treatment Process Expansions and Upgrades	**$494,370,000**
Solids and Biosolids Handling Processes and Disposal	
Additional Dewatering Capacity	$7,950,000
Refurbishment of Digesters to Increase Capacity	$13,500,000
Biosolids Thermal Reduction Disposal Facility	$90,000,000
Total for Biosolids Handling Processes and Disposal	**$111,450,000**
Electrical/Power System	
New electrical and power systems	**$69,300,000**
Total Woodward Avenue WWTP Capital Cost	**$675,120,000**

Notes:
1. Total including 15% engineering and 20% contingency.

3.2 Costs of Upgrade and Expansion Requirements

The February 2007 report presented a cost breakdown for upgrades based on cost information available at that time. Table 4 presents cost breakdown, using the same percentage allocations that were developed for and presented in the 2007 report for non-growth and development, however; costs have been updated based on 2008 information.

Table 4 Costs for Upgrading and Expanding Woodward Avenue WWTP for 2031 Planning Period

Upgrade/Expansion Component	% Allocated to Development in 2007 Report	Updated 2008 Capital Cost	Allocated to Existing Rate Payers[1]	Allocated to Development[1]
Wastewater Treatment Process Expansion and Upgrades	56.6%	$494,370,000	$214,570,000	$279,810,000
Additional dewatering capacity	100%	$7,950,000	$0	$7,950,000
Refurbishment of digesters to increase capacity	100%	$13,500,000	$0	$13,500,000
Biosolids thermal reduction disposal facility	17.5%	$90,000,000	$74,250,000	$15,750,000
Electrical/power system	17.5%	$69,300,000	$57,170,000	$12,130,000
Total		**$675,120,000**	**$346,000,000**	**$329,120,000**
% Allocation		**100%**	**51%**	**49%**

Notes:

1. Allocated based on % allocation from KMK (2007).
2. Total including 15% engineering and 20% contingency.

For new costs, additional dewatering capacity and refurbishment of existing digesters is required only ot provide capacity for growth. For the new biosolids facilities and electrical system upgrades, costs were allocated based on that portion of plant capacity that will be allocated to growth, i.e., 91 ML/d growth out of 500 ML/d total expanded plant capacity or 17.5%.

Based on information in Table 4, the recommended charges to existing ratepayers is $346 million, based on the costs that would be incurred to bring the existing 409 ML/d plant up to current MOE standards. The development charge allocation is $329 million, which would be the cost for expansion of the plant to 500 ML/d and the upgrade to meet more stringent performance requirements that are anticipated with the change to the Certificate of Approval for a capacity expansion.

4.0 References

KMK, November 2006 — City of Hamilton Water and Wastewater Master Plan, prepared by KMK Consultants Limited for the City of Hamilton.

KMK, February 22, 2007 — Woodward Avenue WWTP Development Charges Update, prepared by KMK Consultants Limited for the City of Hamilton.

KMK, March 2008 — Wastewater Treatment and CSO Control in the Woodward Avenue WWTP Service Area Environmental Study Report, prepared by UMA Engineering Ltd. for the City of Hamilton.

City of Hamilton

Woodward Avenue WWTP
Development Charges Update

Prepared for:

City of Hamilton
Water & Wastewater Division
Public Works Department
55 John Street North, 6th Floor
Hamilton, Ontario
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Prepared by:

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February 22, 2007

KMK Project No. 2590

KMK Consultants Limited

KMK

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WOODWARD AVENUE WWTP
DEVELOPMEN CHARGES UPDATE

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1. INTRODUCTION

The City of Hamilton passed a Development Charges By-law in 2004. The 2004 DC By-law was based on infrastructure needs required to support growth estimates out to year 2024 developed at that time. The infrastructure needs were outlined in the DC Background Study.

Since the adoption of the DC By-law, there have been updates to the scope and cost estimates for key infrastructure projects identified the DC Background Study.

A significant project required to support wastewater servicing for existing users and future development is the upgrades to the Woodward Avenue Wastewater Treatment Plant (WWTP).

The City of Hamilton has completed a *Scoping Study* that examined conceptual requirements and a cost basis for upgrading the Woodward Avenue WWTP to meet current and anticipated performance, and expanding the plant to provide capacity for future growth (CH2M HILL, 2005).

Over the last 2 years, the City of Hamilton has also been completing a Water and Wastewater Master Plan. The City has retained KMK Consultants Limited to complete this project. The Master Plan is reviewing and updating the long term water and wastewater servicing strategies. From the Master Plan, cost estimates for key infrastructure projects are being updated and new infrastructure projects are being identified. This will ultimately lead to an updated long term capital program and provide background information for the future review and update to the Development Charges By-law for the City.

Normally, the Development Charges By-law is reviewed and updated at regular intervals. However, based on the additional costs related to new and key infrastructure projects, the City of Hamilton determined that an interim DC update be completed in order to ensure that the short term capital program is financially viable for the City.

As part of the DC update, an assessment of the Woodward Avenue WWTP upgrade and expansion was undertaken to identify growth and non-growth related costs. KMK Consultants Limited was retained complete this analysis. Specifically, while the cost information developed in the 2005 Scoping Study was the basis for this evaluation, these were updated based on more recently established growth projections and projected treatment performance criteria.

It can be noted that technology options are being developed further in the Class EA Phase 3 and 4 study; however, this study is not yet completed. These updated costs will be available for the 2007 Development Charge update.

This report presents the results of the analysis of the Woodward Avenue WWTP capital cost for upgrade and expansion, the recommended growth and non-growth cost allocations and the rationale for the recommended allocations.

2. BASIS FOR DETERMINING UPGRADE AND EXPANSION REQUIRMENTS

2.1 GROWTH

The growth projections and wastewater flow calculations used for the design basis for the Woodward Avenue WWTP expansion are presented in Table 1. Expansion of the plant from its current capacity of 409 ML/d to a capacity of 496 ML/d will be required to service growth for the 2031 planning period.

Table 1 Service Population and Flow Projections[1]

	Current	Rated Capacity	2021	2024	2031
Serviced Population [(1)]	451,958	500,596	557,693	583,856	636,353
Design Flow (ML/d)	347	409	436	448	496

Note:

1. Source: City of Hamilton Water and Wastewater Master Plan, 2006.

It is projected that the existing capacity will be reached by 2011, and by that time, additional capacity will be in place. This is consistent with the City of Hamilton Water and Wastewater Master Plan Policy Paper under Policy G.07 that the City shall "maintain sufficient reserve capacity in its water and wastewater infrastructure and facilities" and schedule future expansions accordingly.

2.2 PERFORMANCE CRITERIA

The level of treatment required for the expanded and upgraded Woodward Avenue WWTP was determined based on a review of current Ontario Ministry of the Environment (MOE) policies and protocol, and from consultation with the MOE during the Master Plan and on-going Class EA Phase 3 and 4 study.

In order to evaluate the non-growth and growth cost allocation, the level of upgrades was evaluated based on the following:

- Upgrade existing plant: If the existing plant would not be expanded, the City of Hamilton would maintain the 409 ML/d capacity, and implement upgrades to bring the plant performance up to current standards (for other wastewater treatment plants with Lake-based discharges).
- Expand plant to 2031 capacity of 496 ML/d: With expansion of the plant to the 2031 capacity, a new Certificate of Approval will be required. To support an application for the increased capacity, the Ontario Ministry of the Environment (MOE) will consider the assimilative capacity of the Harbour, and will impose corresponding effluent criteria to protect the water quality. From discussions with the MOE through the Master Plan and on-going Class EA process, a higher level of ammonia removal and tertiary phosphorus removal will be required.

  The criteria for the expanded plant are being finalized in consultation with the MOE as part of Phases 3 and 4 of the Class EA process.

Table 2 presents the current level of treatment, and upgrade requirements and rationale and/or basis for the anticipated upgrade.

Table 2 Performance Criteria

Treatment Component	Current	Upgrade 409 ML/d[1]	2031 Upgrade	Basis
Peak hour capacity factor (i.e., peak capacity/average capacity)	1.5	2.0	2.0	Flow increases during wet weather due to inflow, infiltration and in Hamilton, combined sewers. A peak factor of 2.0 is a typical design basis for large Ontario plants[2], to minimize bypasses of raw or partially treated wastewater during wet weather.
Effluent ammonia-nitrogen concentration	No limit	5 mg/L (summer) 10 mg/L (winter)	<2 mg/L (summer) <5 mg/L (winter)	MOE policy requires non-toxic effluent with respect to ammonia at the end-of-pipe, with typical design objectives of 5 mg/L (summer) and 10 mg/L (winter). [2] With increase flow (from expanded plant) and sensitivity of Hamilton Harbour, more stringent effluent criteria are anticipated with expansion.
Effluent phosphorus concentration	0.8 mg/L	0.6 to 0.8 mg/L	0.15 mg/L	Typical design objectives for Lake-based plants are in the range of 0.6 to 0.8 mg/L.[2] With increase flow (from expanded plant) and sensitivity of Hamilton Harbour, more stringent effluent criteria are anticipated with expansion.

Notes:

1. Upgrades that would be implemented if there were to be no expansion (i.e., allocated to existing ratepayers)
2. Examples include Lakeview WWTP (448 ML/d), Clarkson WWTP (200 ML/d), Mid-Halton WWTP (75 ML/d) and Duffin Creek WWTP (620 ML/d) all undergoing expansion within last 5 years.

3. UPGRADE AND EXPANSION REQUIREMENTS

Table 3 presents the specific upgrade and expansion requirements, and to achieve the 2031 capacity, as well as the recommended allocation of upgrades and expansion to existing rate payers (non-growth) and new development (growth).

Table 3 Specific Upgrade and Expansion Requirements

Upgrade/Expansion Component	Requirement	Allocated to Existing Rate Payers	Allocated to Development
General treatment upgrades	Modifications to plant influent channel, new chemical dosing system for primary treatment and upgrades to wet weather treatment capacity, return sludge (RAS/WAS) pump replacement.	All upgrades are allocated to existing rate payers	-
Upgrade existing treatment plant to provide ammonia removal and provide 2 peak factor	Existing secondary treatment plant capacity will be 'derated' to 339 ML/d, and additional 70 ML/d capacity will be required. This 70 ML/d capacity will be used to meet the CSO RAP targets by providing secondary treatment to wet weather flows.	New 70 ML/d secondary treatment capacity	-
	New 87 ML/d secondary treatment plant to increase overall plant capacity to 496 ML/d. Increase in tank volume requirements to achieve lower ammonia levels.	-	New 87 ML/d secondary treatment capacity.
New tertiary phosphorus removal process and effluent pumping station	Tertiary filters are not required to achieve upgrades for 409 ML/d. Filters will be required to achieve more stringent performance requirement that will be imposed with plant expansion to 496 ML/d.	-	New tertiary filtration process and effluent pumping station with 496 ML/d capacity

From the information in Table 3, the following may be summarized:

- There are a number of upgrades required to maintain the serviceability of the existing plant and address deficiencies. The costs of these would be non-growth related.
- With implementation of the current standards for peak flow factors and ammonia removal, the existing 409 ML/d secondary treatment plant will be 'derated' to about 339 ML/d, requiring construction of 70 ML/d to maintain the existing rated capacity of 409 ML/d. The derated plant capacity is less than the current average flow of about 347 ML/d. The additional 70 ML/d capacity is required to meet the CSO RAP targets by providing secondary treatment to wet weather flow. These costs would be non-growth related.

- New 87 ML/d of secondary treatment capacity is required to increase the plant capacity from 409 ML/d to 496 ML/d. In addition, larger secondary treatment tanks will be required with the expansion to achieve lower ammonia levels that will be imposed with a change to the Certificate of Approval for the expansion. These costs would be directly growth related.
- A new tertiary phosphorus removal process and effluent pumping station will be required to achieve the low phosphorus loading target that will be imposed with the plant expansion.

4. COSTS OF UPGRADE AND EXPANSION REQUIREMENTS

Table 4 presents the cost breakdown for the upgrades and expansion components of the Woodward Avenue WWTP for the 2031 planning period. It is important to note that the cost basis is the Scoping Study (CH2M HILL, 2005), with adjustments for the most recent population projections. Specifically, this means:

- Costs are in 2005 dollars; there has been significant inflation in the wastewater plant construction industry in recent years, and with estimated annual inflation rates in the range of 10%.
- Capital costs do not include:
  - Effluent disinfection upgrades, which will be required to meet MOE policies for non-toxic effluent, estimated at $20 million
  - Capital upgrade requirements for solids handling processes, including WAS thickening, digestion, dewatering and final disposal, estimated at $60 million
  - An upgrade to back-up power, estimated at $40 million
  - Other upgrades or alternative technologies that are being evaluated to meet the various regulatory pressures and targets.

Updated capital costs, including those for the above components, are being developed in Phases 3 and 4 of the Class Environmental Assessment (EA) study, that will be completed mid-2007 and the City of Hamilton Biosolids Master Plan. Based on the information available at this time, these cost will be approximately $120 million.

Based on information in Table 4, the recommended charges to existing ratepayers is $94.6 million, based on the costs that would be incurred to bring the existing 409 ML/d plant up to current MOE standards. The development charge allocation is $123.3 million, which would be the cost for expansion of the plant to 496 ML/d and the upgrade to meet more stringent performance requirements that are anticipated with the change to the Certificate of Approval for a capacity expansion.

It is recognized that the full cost for the plant expansion to 496 ML/d of $217.9 million, is less than the $340 million documented in the Woodward Avenue WWTP Scoping Study (CH2M Hill, February 2005). That cost was based on an earlier 2031 capacity projection of 600 ML/d.

Table 4 Costs for Upgrading and Expanding Woodward Avenue WWTP for 2031 Planning Period

Item	Allocated to Existing Rate Payers	Allocated to Development
Primary Treatment		
Influent channel	$1,900,000	$0
CEPT	$4,100,000	$0
Wet weather treatment capacity	$7,600,000	$0
North Plant Upgrades		
RAS/WAS pump replacement	$6,700,000	$0
South Plant Upgrades		
RAS/WAS pump replacement	$4,420,000	$0
Secondary Treatment Upgrades		
Aeration	$9,820,000	$20,840,000
Secondary Clarifiers	$12,240,000	$16,400,000
Tertiary Filter	-	$16,700,000
Effluent pumping station	$0	$7,020,000
Subtotal (A)	$46,780,000	$60,960,000
Additions (20% of A)	$9,356,000	$12,192,000
Subtotal (B)	$56,136,000	$73,152,000
Overhead/Contingency/Bond Insurance etc. (48.5% of B)	$27,225,960	$35,478,720
Non-construction (20% of B)	$11,227,200	$14,630,400
Total Estimated Capital Cost	**$94,589,160**	**$123,261,120**
Additional Costs (not included at this time)		
Inflation[1]	$19,864,000	$25,885,000
Solids and Biosolids Handling Processes[2]	$49,500,000	$10,500,000
UV Disinfection[2]	$16,500,000	$3,500,000
Back-up Power Upgrade[2]	$33,000,000	$7,000,000
Total Additional Costs	**$118,864,000**	**$46,885,000**

Note:

1. Additional cost due to inflation from 2005 dollars to 2007 dollars for Total Estimated Capital Cost, estimated at 10% per year.
2. Estimated costs in 2007 dollars, including additions (20%), overhead/contingency/bond insurance (48.5%) and non-construction costs (20%). Total estimated capital cost for each item prorated based on 409 ML/d (82%) to existing ratepayers and 87 ML/d (18%) to new development.
3.

5. ALTERNATE CONSIDERATIONS

To provide greater rationale for the recommended cost allocation to existing rate payers and future development, an alternate scenario for providing future servicing for the 2031 planning period was examined. This alternative is based on separate management of existing flows and future capacity requirements, as follows:

- Existing Woodward Avenue WWTP: While its capacity would be maintained at 409 ML/d, assuming that the plant would be upgraded to achieve the stringent performance criteria anticipated identified in Table 2 for the 2031 planning period.
- New growth: A new 87 ML/d plant would be constructed as a separate facility, complete with new pumping, treatment, outfall and solids management facilities. It is anticipated that the effluent discharge criteria would be similar to that of other new plants in the province and would require tertiary level of treatment.

The estimated costs and allocation for the alternate scenario, relative to the cost-allocation recommendations presented in this memorandum, are shown in Table 5.

Table 5 Costs for Upgrading and Expanding Woodward Avenue WWTP for 2031 Planning Period

Item	Cost of Recommended Scenario (See Table 4) ($ million)	Alternative Scenario		Cost Difference ($ million)
		Basis	Cost ($ million)	
Allocated to Existing Rate Payers	$94.6	Upgrade existing Woodward Avenue at 409 ML/d to stringent effluent limits	$134.0	$39.5
Allocated to Development	$123.3	Construct new 87 ML/d plant	>$180.0[1]	>$56.7

Note:

1. Excludes cost of new conveyance to deliver wastewater to new site, outfall and land purchase, the cost for which could be in excess of $20 million.

As shown, the recommended scenario relative to the alternate scenario offers cost benefit to both existing ratepayers and development. The recommended approach reflects a reasonable assessment for the existing ratepayers and future development to maximize use of existing infrastructure and realize the cost-efficiency of the preferred solution.

For the recommended approach, future development benefits by not having to pay for treatment plant components with available capacity for the 2031 flows, including:

- Pumping
- Headworks
- Primary treatment

- Outfall
- Site area/land.

An additional benefit of the recommended scenario is that the upgrades and expansion could be completed in a much shorter time frame than would be required to proceed with a new plant scenario. A new plant scenario would require a separate Class EA study, followed by negotiations for purchase of land, and a significant consultation program for nearby land users and other stakeholders that could be affected. Thus, the time required to complete the Class EA study for the alternate scenario would extend the date when the City could move forward into design and construction of the capacity required for growth.

APPENDIX F
STORMWATER MANAGEMENT SERVICING NEEDS

AMEC (FORMERLY PHILIPS ENGINEERING)

CITY OF HAMILTON
DEVELOPMENT CHARGES UPDATE

STORMWATER

May 2011

AMEC EARTH & ENVIRONMENTAL
3215 NORTH SERVICE ROAD
BURLINGTON, ON L7R 3Y2

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APPENDICES

1. INTRODUCTION

This Background Study forms part of the overall study to carry out a review of Water and Wastewater, GO Transit, and Stormwater Development Charges in the City of Hamilton. This 2-year review includes changes and updates affecting the determination process for the stormwater component of the Development Charges that have occurred in the 2009-2011 period. The changes and updates can be summarized as follows:

- New projects have been identified and added
- New stormwater-related studies, and associated project and costs estimates, have been completed and adopted by the City (either superseding older studies, or where no earlier studies existed)
- New land requirement calculations for stormwater management facilities, where no studies exist, have been developed by the City, based on recent actual facility land requirements
- Projects have been updated/modified
- Projects have been removed due to changing requirements
- Projects have been constructed and financed through the Development Charges
- Projects have been deleted from the planning timeframe of 2031 as a result of the updates to the City's growth forecasts.
- Removal of non-residential stormwater facility growth costs from the Development Charge and have non-residential developers provide their stormwater management facilities directly.
- On-site open watercourse improvements are to be the responsibility of the individual developments.
- In instances where both residential and non-residential growth lands are proposed to contribute to a stormwater management facility, the areally-estimated component shares have been separated for costing purposes.

In addition to the above, unit rates for land costs have increased, and have been provided by the City Real Estate Department; however recent (2009-2011) actual construction contracts within the City have been reviewed and capital costs for the materials for construction of stormwater infrastructure have not appreciably changed 2009-2011.

1.1 Study Area

For the 2011 Development Charges Update, development in the former member municipalities of the City of Hamilton has been combined for financial purposes, however a column in the stormwater costing tables has been included for reference purposes (and to assist in locating the project on the overall drawing), in which the City has been divided into the following seven (7) areas:

- Ancaster,
- Binbrook/Mount Hope,
- Hamilton Mountain,
- Stoney Creek (Lower),

- Stoney Creek (Mountain),
- Waterdown,
- Other (Hamilton Downtown, Dundas, Greensville, Carlisle, Freelton, and other outlying areas).

1.2 Background and Purpose

This background report provides information for the portion of the Development Charges relating to stormwater including: channel system improvements, off-site erosion control, stormwater management works, oversizing of stormwater related infrastructure, and culverts and bridges related to identified road projects. Projects included in this report are future growth related, which include both planned and unplanned projects. Future growth related information has been collected from the City and City-approved studies and, where no information was available, appropriate assumptions and calculations have been made.

This report provides a summary of the approach used in establishing and summarizing of the stormwater-related Development Charges for both residential and non-residential development. The report consists of the following sections: Introduction, Municipal Stormwater Drainage Policies and Criteria, Methodology, Development Charges Summaries, and Conclusions.

1.3 Development Charges Act: Storm Services

According to the Development Charges Act (S.O. 1997, Chapter 27), the “council of a municipality may by by-law impose development charges against land to pay for increased capital costs required because of increased needs for services arising from development of the area to which the by-law applies”.

The services referred to include stormwater drainage and control. Costs to acquire land may be included, as well as costs to undertake studies in connection with any of the services, as well as the cost of the development charge background study (1997, c.27, s.3, 5).

The Development Charges are based on a projection of the costs to service new development to “build-out” over the next 20 years (i.e. to 2031).

All components of drainage works that have been considered to require development funding have been included. Storm drainage infrastructure has been classified into five categories: open watercourses (channel system improvements), off-site erosion control (not previously identified), stormwater management facilities (quality and quantity), storm sewer oversizing, and culverts/bridges (not previously identified, and associated with new or widened roads).

1.4 City of Hamilton Development Charge – Local Service Policy

Within a development charge policy, there are certain works which are deemed "local services" which remain the responsibility of the developing landowner. The following providers for the City of Hamilton's proposed local service policy for stormwater service:

Storm Sewer Oversizing (Residential and Non-Residential)

- Oversizing will be applied only to a storm sewer system that provides for the drainage and conveyance of runoff resulting from a design storm event having a 5 year return period (minor system).
- Development Charge contribution for storm sewer oversizing is applicable for sewers in excess of 1200mm diameter.
- Storm sewers conveying a 1 in 100 year design (major system) will not be eligible for "oversizing".
- DC contribution for "oversizing" is on a flat rate basis as outlined in the City's Financial Policies.
- "Oversizing" will not be applied to temporary works.

Stormwater Management Facilities

Residential:

- Centralized stormwater management facilities identified in the City's Stormwater Master Plan, Master Drainage Plan or Watershed/Subwatershed Study will be considered for inclusion as development charges projects.
- Development charge contributions for facilities will be limited based on the total cost (land and capital costs) as outlined in the DC Background Study. Included in the capital cost is engineering design and soft costs for each facility.
- Storm sewer conveyance system to the SWM facility is considered local service and not eligible for DC contribution. Piping and headwall for the conveyance system into the SWM facility is developer responsibility.
- Residential land cost for SWM facilities have been set at $360,000/Ac, except for Ancaster and Waterdown which has been set at $450,000/Ac. Facilities located in open space lands, the value of the land will be established by an independent appraisal, provided by the developer. The value of compensation for land will be based on the appraisal up to the maximum value of land in the DC background study.
- Developer will be responsible to acquire lands for facilities located outside a plan of subdivision. The City will not act as a third party agent in the negotiation and acquisition of lands for stormwater management facilities on behalf of private interest, unless otherwise directed by Council. The value of compensation for land will be determined by an independent appraisal, provided by the developer up to the maximum value of land in the DC background study.
- Where a developer has constructed a facility as a condition of development, at his own cost and the facility is considered to be permanent and part of an ultimate solution, credit for the related stormwater component will be applied for the un-built units within the subdivision.
- Capital cost may include items as follows:
  a) Siltation control
  b) Excavation (excludes costs to haul surplus material off site and/or placement and compaction of surplus material within subdivision)
  c) Fine grading
  d) Decanting area
  e) Forebay structures, pond liner, cooling trenches, etc.
  f) SWMP outlet structures (ditch inlet, manhole, pipe, etc.) within pond to the first structure outside of the pond (outlet works beyond this is developer responsibility)

g) Emergency overland flow route
h) Maintenance access road
i) Landscaping/Shading
j) Pond signage

- Temporary outlet works including the acquisition of easements are developer responsibility
- Studies required to facilitate orderly development are developer responsibility
- Costs associated with construction monitoring during and post construction, including siltation/erosion remedial works is developer responsibility
- On-site open watercourse improvements are to be the responsibility of the individual developments.

Non-Residential:

- Non-residential developers provide their stormwater management facilities directly.
- On-site open watercourse improvements are to be the responsibility of the individual developments.
-

Low Impact Residential Development

- City is supportive of the implementation of LID however; these measures are only effective through regular maintenance. Developments under Site Plan Control that incorporate LID measures, and only in the absence of an identified stormwater management facility to contribute to, may be eligible for a cost recovery of an amount equal to up to 75% of the Stormwater Development Charge Payable. The details of this policy will be provided within a staff report which will accompany the DC Background Study and draft DC By-law in June, 2011.

1.5 Background Information Collected

City staff, through the Technical Committee noted in Section 1.5, has supplied the following background information:

- Applicable background reports
- Summary of stormwater management facility construction costs and land areas
- Digital topographic mapping
- Digital growth-related land use fabric (GRIDS)
- Digital DRAFT Staging of Development Plan land use fabric (January 2011)
- Stormwater policy/philosophy related to Development Charges
- Reviews and comments on overall map of growth areas and identified projects
- Culvert and bridge database
- Subdivision-related storm sewer oversizing database.

1.6 Administration

Many City of Hamilton staff have assisted in collecting the background information for this study, as well as meeting with Amec Earth and Environmental staff to review the various stormwater projects, cost estimates, financially committed projects, and underlying philosophy and assumptions; these have included:

Tony Sergi, Director of Development Engineering
Sally Yong-Lee, Acting Manager of Infrastructure Planning
John Morgante, Development Engineering
Monir Moniruzziman, Development Engineering
Wayne Thompson, Sr Financial Analyst, Capital Budgets & Development Finance

2. MUNICIPAL STORMWATER POLICY AND CRITERIA

2.1 Overview

The costs to provide stormwater servicing are, in accordance with the Development Charges Act, related to the level of service to be provided.

The City of Hamilton's Storm Drainage Criteria and level of service has been summarized in this Section. The City's standards have been developed to provide this level of service, and to recognize other Provincial and Federal criteria for flooding, erosion, stormwater quality, and fisheries habitat protection and enhancement.

2.2 Storm Sewer System

The storm sewer system provides for the drainage and conveyance of the runoff resulting from a design storm event having a 5 year return period. In the former municipalities of the City of Hamilton, the storm sewers were designed to have the capacity for storm events ranging between a 1 in 2 year event and approximately a 1 in 50 year event (ref. Table F1):

TABLE F.1
COMPARISON OF FORMER AREA MUNICIPALITIES
STORM DRAINAGE SYSTEM CRITERIA AND POLICY

Former Municipality	Minor System Criteria	Foundation Drainage Requirements [2]	Combined Sewers	Roof Leader Policy	Major System Criteria
Hamilton	18 – 50 yr [1]	Gravity	Yes	Direct to Sewer	100 yr
Ancaster	2 yr	Sump Pumps	No	Surface	100 yr
Dundas	2 – 5 yr	N/A	No [3]	N/A	100 yr
Flamborough	2 – 5 yr	Gravity/ Sump Pumps	No	Surface	100 yr/Regional [4]
Glanbrook	5 yr	Sump Pumps	No	Surface	100 yr
Stoney Creek	5 yr	Gravity	No	Surface	100 yr

[1] 1942 - 1992 (inclusive) used an 18 year storm event; post 1992 used 50 year. Both design storms uses in Modified Rational Area Method
[2] Foundation drainage requirement exceptions are currently permitted upon receipt of a SWM report.
[3] The Pleasant Valley neighbourhood (Dundas) only has a combined sewer system permitted by By-Law.
[4] Regional event is Hurricane Hazel

New storm sewers will have to be designed to the new criteria, but new development must also reflect both the external upstream drainage and the existing storm sewer system (potentially none) downstream of the site.

The City of Hamilton Criteria and Guidelines for Stormwater Infrastructure Design (September 2007) outlines the criteria for the storm sewer system as follows:

Approved Master Drainage Plans (MDP's), which have established storm sewer sizing criteria other than 1 in 5 year standard will govern. In the absence of approved MDP's, storm sewers shall be designed to a minimum 1 in 5 year, unsurcharged standard (i.e. 85% of pipe capacity). For any storm sewer to be assumed by the City the minimum allowable pipe diameter is 300 mm.

Interfacing between new storm sewers designed to the minimum 1 in 5 year, unsurcharged standard and existing storm sewers of variable sizing standard shall require hydraulic analysis of the existing and proposed storm sewers. Flow capacity of the proposed storm sewer shall be determined based on the receiving existing sewer remaining unsurcharged. The proposed storm sewer flow capacity would either be the 1 in 5 year standard or designed to allow the existing storm sewer to remain unsurcharged. Should the proposed storm sewer flow capacity be required to be less than the 1 in 5 year standard, to prevent downstream surcharging, inlet capacity for the storm sewer should be designed accordingly. Should the existing downstream system be already surcharged, the proposed upstream storm sewer should not increase the level of surcharging downstream.

Hydraulic analysis of the proposed and existing storm sewer system shall provide hydraulic grade lines for the inlet capacity and/or 1 in 5 year standard and 1 in 100 year standard. Hydraulic analysis should demonstrate that no negative impact on the receiving storm sewer system results from the proposed storm sewer. The extent of the downstream off-site analysis needs to be verified with City staff prior to initiation, to ensure that downstream conditions are adequately accounted for in the analysis. The City shall provide the consultant with the 100 year hydraulic grade line for the existing storm infrastructure system when available. Should downstream storm sewer surcharging be a concern under existing conditions, the proponent may be required to restrict inlet capacity to ensure no negative impact on the receiving system. In addition, the proponent is to ensure that adequate overland flow capacity is available in the development and in the receiving major system, incorporating the influence of the restricted inlet capacity of the storm sewer system.

Storm Sewer Oversizing

The Development Charges are applicable primarily to oversizing of existing or new storm sewers, to allow for the conveyance of runoff from new development. Current City financial policy provides for relief for storm sewers in excess of 1200 mm in diameter. Oversizing is common when a development has a large upstream drainage area that has been proposed to also be developed. When the stormwater peak flows from ultimate land use must be conveyed through a downstream development, the Development Charges provides a method for collecting funds for the net difference between the storm sewer system required solely for the one development, and the oversized system required for the multiple developments.

In some areas, a storm sewer system may not be viable, and the major overland system may not be able to safely convey the runoff resulting from a 1 in 100 year design storm event. In this

case a relief sewer or conveyance mechanism may provide the additional capacity required, and be funded through Development Charges.

2.3 Road Crossings

Waterway openings for culverts and bridge crossings shall be designed in accordance with the Ministry of Transportation Ontario (MTO) policies and guidelines.

Notwithstanding the MTO's drainage policy and guidelines, it is required that new roadway culverts and bridges have sufficient conveyance capacity to pass the Regulatory flood (larger of Hurricane Hazel or 100 year event), in order to avoid adverse backwater effects (ref. MTO Directive B-100). If, due to economics or other mitigating circumstances, this is not feasible, a backwater analysis must be undertaken to determine the limits of upstream flooding and provide necessary mitigating design modifications.

Arterial and collector roadways in new developments should be, where possible, the only road classifications permitted to cross a watercourse having a drainage area in excess of 125 ha. Spacing and location of roadway crossings other than arterial or collector roads may be considered by the City when documented within the Stormwater Management Plan.

Freeboard and clearance (as defined in the governing MTO manuals and the Ontario Bridge Code) requirements for watercourse crossings should be based on current MTO criteria.

Where a permit is required from a Conservation Authority, watercourse crossings will not be permitted to increase upstream flooding on private lands, unless appropriate waivers can be secured.

Culvert replacements may require a Class Environmental Assessment as outlined within the City's Storm Drainage Policy.

Allowable Regional storm event (Hurricane Hazel) flooding depths on roadways should be determined based on the standards within the Ontario Ministry of Natural Resources Natural Hazards Technical Guides, latest revision.

2.4 Natural Watercourse Systems

The City of Hamilton Criteria and Guidelines for Stormwater Infrastructure Design (September 2007) outlines the criteria for the open watercourses as follows:

Where watercourse alterations are proposed as part of a development, the design of such alterations shall incorporate and consider the following:

Design Approach and Principles

- Channel design is to be based on natural channel forming processes to achieve a dynamically stable system. The channel evaluation methodology and design approach is to be consistent with the most current Provincial guidelines (ref. Ontario Ministry of Natural

Resources Natural Hazards Technical Guides, March 2003 and "Adaptive Management of Stream Corridors in Ontario", MNR, 2001).

- Alteration to a regulated watercourse will require a permit from the respective Conservation Authority (Development, Interference with Wetlands and Alterations to Shorelines and Watercourses) and potentially clearance/authorization from the Federal Department of Fisheries and Oceans (Fisheries Act) and Ontario Ministry of Natural Resources (Lakes and Rivers Improvement Act).

- Remedial works shall incorporate fish habitat protection/mitigation or compensation in accordance with the requirements of the Federal Department of Fisheries and Oceans (DFO) and Ontario Ministry of Natural Resources (MNR), related to stream type and significance.

- Remedial works shall incorporate the requirements of the governing Official Plan, as well as the requirements of provincial Ministries and other public agencies for protection of associated natural features such as:

  Environmentally Significant Areas (E.S.A.)
  - City of Hamilton
  - Conservation Authorities

  Niagara Escarpment
  - Niagara Escarpment Commission (NEC)

  Heritage Sites
  - Ontario Ministry of Tourism, Culture and Recreation

Setbacks

Conservation Authorities have established various watercourse setback policies which regulate development boundaries. The proponent should always verify that the most current Conservation Authority's setback policies are being adhered to. Each of the four Conservation Authorities, Hamilton Conservation Authority (HCA), Niagara Peninsula Conservation Authority (NPCA), Grand River Conservation Authority (GRCA), and Conservation Halton (CH), requires development to adhere to their specific setback policies. The most current policies were adopted in 2004, with each Conservation Authority creating a specific version of the Generic Regulations for development in or adjacent to hazardous lands and other regulated areas, i.e. "Development, Interference with Wetlands and Alteration to Shorelines and Watercourses".

The size of setbacks from the watercourse edge to developable lands is typically a function of the significance of the valley form, the sensitivity of the watercourse and the type of development (building or other).

The Conservation Authorities may establish setbacks using "Understanding Natural Hazards", MNR, 2001 to define the erosion hazard limit using stable slope allowances. Development

Proponents should be aware that watercourse setbacks will typically be established by a Conservation Authority using the greater of the fisheries, valley and floodplain setbacks.

Access/Maintenance

- Creek block dedications adjacent to private land in new developments shall be fenced to prevent human access and encroachment. Fencing shall be on public property, 150 mm from the property line. Private access gates to creek block areas are not allowed.

- Natural channel design shall consider channel and utility maintenance requirements by incorporating access routes. Access routes may be located within the appropriate top of bank setback limit or adjacent to the low flow area in appropriately designated areas.

2.5 Stormwater Management Facilities

The City of Hamilton Stormwater Policy (March 2004) outlines the criteria for stormwater management quality, quantity and erosion control as follows:

Quality Control

Urbanization typically increases the contaminant load (i.e. sediment, metals, nutrients, bacteria) to natural stream systems. To mitigate this effect, stormwater quality treatment is required for all new development and redevelopment (including reconstruction of roadways with additional lanes, widening and cross-section revisions as required by review on an individual case basis by the Ministry of Environment) within the City of Hamilton, except for areas draining directly to a combined sewer system.

Stormwater quality treatment should provide a comprehensive approach to both surface runoff and groundwater. Thus, as a general consideration, maintenance of the natural hydrologic cycle including infiltration is encouraged and the use of stormwater management practices (SWMP) which enhance or maintain infiltration should be considered for each development.

Generally, active infiltration measures, such as soakaway pits and rear yard ponding, will be most applicable in permeable soils areas and their use will require supporting soils property documentation. Passive measures such as disconnection of roof leaders have been historically applied in many areas and shall be implemented in all areas unless specific constraints (such as in the former City of Hamilton and Town of Dundas where zero lot line construction on narrow width lots is permitted, or in the older City of Hamilton downtown areas where there is insufficient pervious area) preclude these measures. In all cases, the potential for groundwater contamination shall be considered where infiltration of road runoff is contemplated. In areas where hydrogeologic concerns are identified, particularly in areas where groundwater is used for human consumption and/or critical linkages to fisheries habitat are present, additional study and analysis may be required to determine the appropriate level of mitigation.

Stormwater quality treatment measures shall adhere to the specific guidelines for stormwater management practices that have been developed by the Province (ref. Stormwater

Management Planning and Design Manual, Ministry of Environment, March 2003, or subsequent updates).

The design of stormwater quality facilities shall conform to existing Provincial requirements (ref. Stormwater Management Planning and Design Manual, MOE, March 2003, Water Management Policies, Guidelines Provincial Water Quality Objectives (Blue Book), MOEE, 1994), as well as current policies within the City of Hamilton (i.e. Hamilton Harbour Remedial Action Plan, Vision 2020), or subsequent updates of the foregoing.

All new development shall implement a stormwater quality management strategy, which considers surface runoff and groundwater in compliance with the existing provincial and municipal policies.

In areas of existing development where re-development is proposed, requirements for stormwater quality measures will be evaluated on a site-specific basis, with regard to the feasibility of implementation. Where on-site measures are considered infeasible, or in areas serviced by combined sewers, the City of Hamilton's Planning and Development Department may consider the potential for contributions to off-site improvements in the form of a cash-in-lieu policy, as in the current Provincial Stormwater Management Planning and Design Manual, March 2003, or subsequent updates. In order to appropriately direct these resources, a Master Storm Water Quality Plan (a regional assessment to identify retrofit locations and costs) is being contemplated by the City's Public Works Department. A 'pilot' study has been prepared for the former community of Stoney Creek.

Quantity Control and Flood Protection

Urbanization causes increases in runoff volumes and rates, due to an increase in impervious area and changes in conveyance systems. Without proper stormwater management, these increases may result in flooding and erosion.

The specified level of control for subject lands in the City of Hamilton is designated by a Watershed/Subwatershed or Master Drainage Plan where they exist. Such plans account for additional constraints (i.e. economic and physical limitations) which may limit the capacity of proposed stormwater management systems. Such plans may also demonstrate that the existing downstream capacities are sufficient to accommodate local increases in post-development peak flows (i.e. oversized sewers or watercourse reaches with adequate capacity and resistance to flow increases).

Local Conservation Authorities, through their mandate to control flooding and limit flood damage, have developed criteria for runoff control. Hence, application of these criteria through a co-ordinated approach to drainage planning on a watershed and subwatershed basis is required to ensure effective runoff control and minimization of flood damages.

Several Municipal jurisdictions have implemented a ***"zero increase in peak runoff rate"*** *policy for controlling post-development runoff. While this type of policy provides simple and clear direction regarding stormwater management flood control, a uniform application of this type of*

policy does not consider the potentially negative effects on watercourses from extended periods of controlled peak discharge (i.e. increased erosion).

In cases where no Master Drainage Plan (MDP) or Watershed/Subwatershed Planning has been completed or development lands are considered as external drainage areas to a MDP, watershed/subwatershed planning areas, consultation with the City shall determine if runoff peak flows shall be controlled to pre-development levels or alternative stormwater management is required. Discussion with the City's Planning and Development Department shall be required to determine the scope of assessment based on the potential impact on the receiving storm system (ref. Conditions for Practice). Should the proponent establish, to the satisfaction of the City's Planning and Development Department, that the potential impact of the proposed development would be minimal, the City's Planning and Development Department could decide that detailed modelling and analysis may not be required, as per the Conditions of Practice within the Criteria and Guidelines for Stormwater Infrastructure Design Manual. Should the City's Planning and Development Department deem a more detailed assessment appropriate, the proponent would need to demonstrate through appropriate modelling and analysis, that uncontrolled flow will not cause detrimental impacts on downstream properties and watercourse systems as per the Criteria and Guidelines for Stormwater Infrastructure Design Manual. At the development application stage, before the City's Planning and Development Department will accept an increase in runoff rates, the proponent must also receive endorsement from the agencies having jurisdiction. Over-control of runoff (i.e. less than pre-development runoff), may also be required as it relates to downstream constraints. .

2.6 Erosion Control

The rate that uncontrolled runoff, due to urbanization, can accelerate the natural evolutionary processes of a watercourse depends upon topography and soil conditions. When erosion and/or bank instability is probable (e.g. from outlets from future development areas), the proponent shall either provide effective on-site or system controls (e.g. end-of-pipe controls), stabilize the receiving watercourse by appropriate remedial measures, or contribute to a fund designated towards future watercourse improvements, typically identified in Watershed and Subwatershed Plans. Should on-site or system controls not adequately control flows below the receiving system's erosion threshold, either off-site watercourse remedial measures or contribution to a fund shall be required.

Requirements for erosion control will generally be determined through upper level studies such as Watershed/Subwatershed/Master Drainage Plans. In these cases, the proponent(s) will be required to provide mitigation in accordance with the Watershed or Subwatershed Plans or with the Master Drainage Plans, as well as policies of the local Conservation Authority.

In areas where no Watershed, Subwatershed Plan or Master Drainage Plan exists, it shall be the responsibility of the development proponent to mitigate potential erosion impacts in accordance with Provincial Guidelines, unless it can be demonstrated through appropriate modelling and/or analysis that erosion processes will not be adversely affected by the proposed development.

In areas where the downstream receiving watercourse is determined to be unstable, or where control/over control of flow rates is either not possible or not feasible, design of watercourse alterations would be considered subject to design in accordance with Natural Channel Design principles.

The City of Hamilton supports Natural Channel Design Principles, as specified by the Province in Natural Channel Systems, An Approach to Management and Design, MNR, 1994 (or most recent update) and "Adaptive Management of Stream Corridors in Ontario", MNR 2002 (or most recent update) Implementation of Natural Channel Design principles on area watercourses shall follow the guidance within the Criteria and Guidelines for Stormwater Infrastructure Design Manual. Any watercourse alteration shall be designed to the future flow regime with stormwater management controls in-place.

Storm sewer outfalls in natural channels should be provided with proper protection against erosion, which includes appropriate bank scouring protection on either side of the outfall and creek. When storm sewer outfalls outlet to steep and/or deep valleys, drop structures shall be designed in such a manner as to ensure bank stability. Such local erosion protection measures shall be designed so as not to interfere with the natural channel forming processes of the receiving watercourse system. Natural channels shall be designed to accommodate various flow regimes resulting from phased stormwater management measures.

Although both swales and ditches only provide a flow conveyance function and not the natural channel form, swales and ditches should be designed with appropriate erosion protection. Erosion protection measures shall be provided at storm outfalls and for the swale/ditch according to erosion thresholds.

3. METHODOLOGY

3.1 Overview

All components of drainage works that have been considered to require development funding have been included in this assessment/calculation. Storm drainage infrastructure has been classified into three major groups: open watercourses, storm sewers, and stormwater management facilities. For the purposes of this assessment, the charges have been separated into five categories of work as follows:

A. Open Watercourses: Channel System Improvements (identified projects)

- Erosion control and conveyance works, including channelization and major culverts, identified along watercourses to address the impacts of growth, such as increased peak flows, volumes, and durations of erosive flows, as identified in currently approved studies

B. Open Watercourses: Erosion Control – Anticipated Future Works

- Off-site (immediately downstream of new development) erosion control and conveyance works not yet identified in any approved studies along watercourses to mitigate impacts of growth (i.e. areas not covered in current Master Drainage Plans, Subwatershed Studies, etc.).

C. Stormwater Management (Quality and/or Quantity Facilities)

- Stormwater quantity and quality control infrastructure required to manage runoff from future growth areas, to mitigate impacts on downstream systems.
- Retrofit facilities for managing runoff from future growth included
- Includes end-of-pipe infrastructure such as wetlands, wet ponds, dry ponds, oil and grit separators
- Includes certain qualifying source controls, such as Best Management Practices, and Low Impact Development

D. Oversizing of Trunk Storm Sewers

- Includes the oversizing of storm sewers to accommodate the new growth, or where multiple new growth areas combine to generate sufficient additional runoff that a sewer in excess of 1200 mm in diameter is required; the cost of the oversizing would be considered a Development Charge. Local storm sewers to service new growth, less than the 1200 mm diameter threshold, are considered a local Developer Contribution, and are not included in the Development Charge.

E. Culverts and Bridges: Anticipated Future Works

- Future works (i.e. those not identified in previous studies as part of Category A) which require an upgrade (either in length or capacity) normally associated with new road construction to support growth.

A further two sub-categories have been included, to specifically capture the infrastructure required for the newly identified growth areas:

- GRIDS stormwater management facilities
- GRIDS watercourses

GRIDS is the City's Growth Related Integrated Development Strategy, which includes the areas identified as Potential New Business Park, in the existing Airport Business Park Special Policy Area, new employment lands adjacent to the Airport SPA lands, and a proposed urban boundary expansion/employment lands to the south and east of Highway 20 and Highway 53/Elfrida.

This growth area includes the lands which are the subject of the recently completed study: Airport Employment Growth District – Phase 2, Dillon et al 2009.

3.2 Future Development (Residential /Non-Residential growth area)

Figures F1-F7 show the City of Hamilton, along with the bounded development areas from previous Development Charge Background Studies. For this 2011 update study, the City has provided a draft (January 2011) development staging plan, which identifies the parcels of residential and non-residential growth, and where possible, the status of the lands with respect to anticipated timing of development. The City Development Engineering staff has also reviewed the proposed time frame of all of the stormwater projects, and grouped them into three time periods: 0-5 years, 6-10 years, and 11+ years. This time period classification has also been correlated with the 2011 budget allocation.

It should be noted that for the purpose of calculating the development charge, there is no distinction between the three time frames. There has been a column left in the costing tables for reference purposes only.

Figures F1-F7 show the approximately forty (40) different subwatersheds that cover the City study area. These subwatersheds form part of four Conservation Authorities, namely: Conservation Halton, Hamilton Conservation Authority, Grand River Conservation Authority, and the Niagara Peninsula Conservation Authority. A complete list of all distinct development areas and the creek into which they discharge, is included in Appendix F1.

3.3 Costing Assumptions

The estimates of the costs are based on the best available information for future projects. A complete listing of all the projects is in Appendix F3. All assumptions used to derive the costs

are listed in this section. The costs are based on estimated construction costs plus a 15 % allowance for engineering, design, legal, and survey. Estimated land costs have also been included in the totals. Residential land costs have been tracked by the City, and currently have been set at $360,000/ac ($889,560/ha), except for Ancaster and Waterdown, which has been set at $450,000/ac. ($1,111,950/ha).

The costs have either been calculated using formulas based on 2009-2011 construction prices from projects completed in the City, and neighbouring Municipalities in the GTAA, where no cost estimates are available in the background reports, or where construction estimates were available, the unit rates used in those estimates are considered to be valid in 2011 (i.e. are the same as rates from current contract bids).

The Development Charge component cost of the project (i.e. the portion attributable to new development) has been determined by examining the percentage of existing development that would benefit from the infrastructure.

3.3.1 Specific Costing Assumptions By Category

A complete summary listing of all projects is in Appendix F2, with the Residential listing first followed by the Non-Residential, and both sorted by geographic area, then category of project.

Costs for Category A [Open Watercourses: Channel System Improvements (identified projects)] have been calculated using the existing studies provided by the City (ref. list of references at the end of the report), and adjusted as per Section 3.3.

Costs for Category B (Open Watercourses: Erosion Control – Estimated Future Works not identified in previous studies) have been calculated as follows:

- for existing open watercourses downstream of new development, the length has been abstracted from the topographic mapping provided by the City,

- The applicable length for erosion protection has been defined by the distances to a receiving water body (i.e. lake), or to a point downstream where erosion is deemed to no longer occur as a result of the subject development. This point has been estimated as the point where the total tributary drainage area exceeds 2 times the area tributary to the development discharge point (i.e. immediately downstream of the new development). This approach is intended to reflect the diminished erosion impact of developed discharge, as the size of the drainage area and flow in the watercourse increases downstream from the point of discharge.

- The percentage of the total length of channel to require erosion works has been established at between 5 and 20 %, depending on the relationship of total development area related to upstream drainage area. The greater the fraction of developed area, tributary to the subject watercourse, the greater the percentage of watercourse assumed to require erosion control. The maximum of 20 % reflects the anticipated benefits from on-site stormwater management which would greatly

reduce downstream erosion potential. However, since volume control is not considered practical in most parts of Hamilton, erosion potential would not be eliminated entirely with on-site controls in place.

- The cost per metre of works has been established as either $750 or $1500 depending on the upstream drainage area (see B1)

- The cost for land (easement) has been assumed to be the same as for stormwater management facilities, i.e. assuming highest and best use for the land. The land required for an easement has been estimated as either 10 m or 20 m width depending on the size of the creek (i.e. drainage area under or over 500 ha), multiplied by the length of creek to be treated. This estimate does not allow for connections between easements on separate sections of the creek.

Costs for Category C (SWM facilities) have either been based on previous studies or, if no estimate was available, the cost has been based on a formula relating the drainage area, required volume, and the required land to accommodate the facility footprint. The cost of land has been set at either $360,000 per acre, or $450,000 per acre in accordance with the City's calculated costs.

Target volumes for stormwater quality, erosion control and flood control vary widely, each being specific to the location and watershed. Ranges have been estimated to be between 100 and 200 m^3/impervious hectare for quality only; between 100 and 400 m^3/impervious hectare for extended detention erosion control, and between 300 to 500 m^3/impervious hectare for flood control. These are based on recent experience in developing urban environments in the Greater Golden Horseshoe. The specific targets will be directly related to the type of receiving watercourse. For sizing facilities in the absence of previous reporting, an average target volume of 475 m^3/impervious hectare has been used, with an approximate impervious fraction of 40 %, therefore an average volume of 190 m^3 /hectare has been used for DC calculation purposes for quality control facilities. An estimated volume of 720 m^3 /hectare has been used for DC calculation purposes for combined quantity/quality control facilities.

The erosion control and flood control volumes are typically placed above the water quality control volumes, hence there may be economies in terms of land requirements when multiple functions are required at a facility. The construction costs have been based on the total volumes.

The land costs have been developed to take into account the required footprint of the facilities and have been based on the following rule:

- If the footprint has been established through a City-approved study, this area is to be used;
- If no study exists, a quality (only) facility or quantity (only) facility will require 4 % of the contributing drainage area; or
- If no study exists, a combined quality/quantity facility (and those combined facilities that include an erosion control volume) will require 6 % of the contributing drainage area.

The general construction cost relationship has been developed from both estimates and actual construction costs of a range of SWM facilities constructed in Southern Ontario over the past five years.

Unidentified Projects

The City has included an item entry under Category C for stormwater management facilities that are currently not identified in the list of projects. The City has had several occasions over the preceding years where development has occurred in such a manner as to require temporary or additional stormwater management works. These works may, in some cases, be determined by the City to provide a long-term benefit to the stormwater system, and hence the City proposes to add these select works to their infrastructure. The City may then credit these works in part or in full, and hence have created this item as a form of a Credit Pool. The City will also review whether previously identified works in the area may need to be updated to reflect the new works.

Low Impact Residential Development Policy

The City of Hamilton supports Low Impact Best Management Measures to complement traditional stormwater management techniques. Low Impact Development Best Management Practices (LID BMP's) essentially promote treatment/management of storm runoff at the source. The benefits of this approach are widely understood and documented, hence not repeated within this document. Key concerns relate to implementation. The issues and challenges associated with the implementation of Low Impact Development Best Management Practices relate primarily to the fact that these measures are typically "on-lot" within private control, outside of the direct control of the Municipality. Due to this basic circumstance, the question is raised by municipal managers as how best to ensure that the "on-lot" measures are maintained, working, and not removed by private landowners and/or businesses. Clearly, by installing these Best Management Practices on private property, there will be an eventual loss of effectiveness, either through lack of maintenance and/or removal in their entirety. The question relates to what extent this "loss" will occur and will this vary by land use.

Notwithstanding, Low Impact Development Best Management Practices in developing subwatersheds, have the potential to reduce the scale and scope of conventional end-of-pipe stormwater management systems. The question related to the foregoing perspective though, is how can this be accounted for functionally and financially in the construction and financing of traditional end-of-pipe stormwater management facilities. It must also be clear, in the case of intensification and infills, whether the stormwater management involves quality, quantity, or both.

As noted earlier, the City of Hamilton is supportive of Low Impact Development measures and as such wishes to encourage these through a form of incentive program. To this end, the City, through this Development Charge, has set up an initial Low Impact Development cost recovery provision in the amount of $5,000,000. At this time, developments under Site Plan Control that incorporate LID measures, and only in the absence of an identified stormwater management facility to contribute to, may be eligible for a cost recovery of an amount equal to up to 75% of

the Stormwater Development Charge Payable. The details of this policy will be provided within a staff report which will accompany the DC Background Study and draft DC By-law in June, 2011.

Retrofits

The City, as part of their Stormwater Master Plan (2007), has assessed the feasibility of retrofitting existing stormwater management facilities in order to provide stormwater quality control and erosion control measures. The objective for the City is to improve environmental conditions in the downstream receiving water bodies.

There are 29 identified retrofit opportunities (e.g. add a quality or erosion component to an area currently receiving only quantity or flood control) in the City. These have been separated into those 11 locations which serve only existing development (therefore not growth-related, and not currently considered), and those 18 which serve both existing and new development (the benefit to existing must be deducted).

For the 18 facilities that meet the criteria, the total area served is 759 ha and the growth-related fraction has been estimated at 54.45 %.

GRIDS

GRIDS is the City's Growth Related Integrated Development Strategy, which includes the areas identified as Potential new Business Park, in the existing Airport Business Park Special Policy Area, new employment lands adjacent to the Airport SPA lands, and a proposed urban boundary expansion/employment lands to the south and east of Highway 20 and Highway 53/Elfrida.

The growth areas identified in the GRIDS study accounts for approximately 75 new projects not included in the 2004 Development Charge, including an estimated 57 SWM facilities and 18 off-site erosion control projects, with the erosion projects lumped into 5 area erosion studies, based on the watersheds and distinct growth areas.

The City has recently completed the Draft Airport Employment Growth District study (December 2009), however this report does not detail the locating of all future stormwater management facilities. There may be opportunities to master plan the areas, and reduce the infrastructure, however it is left at the conservative level for the charge calculation purposes. Once a Final Master Drainage Plan is complete, an update may be required for the GRIDS stormwater management facilities (number, location, and sizes).

The GRIDS development areas are drained by the Welland River, Three Mile Creek, and Twenty Mile Creek, each of which are considered to be sensitive coldwater fish habitat. Based on the anticipated Enhanced level of protection to be applied to the tributaries, it is proposed that all watercourse tributaries will be required to remain open: this therefore increases the number of facilities required to service the area.

Similar to the 2004 and 2009 Development Charge Background Study, there are off-site erosion control studies and potentially work proposed for each receiving tributary downstream of the growth area.

The Airport SPA facilities have been preliminarily sized to have larger footprints on account of the condition that Transport Canada typically imposes on stormwater management facilities near airports. There cannot be open water facilities since these are considered to attract waterfowl, and pose a navigation hazard to aircraft. The facilities have therefore been sized as dry ponds.

Costs for Category D (Oversizing of Trunk Sewers and Culverts) are based on the relative increase in cost for storm sewers over a threshold diameter of 1200 mm, as set by previous City Financial Policy. A list of projects has been generated by the City Development Engineering Department, and is included in Appendix F3-D.

Costs for Category E (culvert and bridge upgrades not identified in previous studies) have been estimated in the following manner:

- Based on the planned DC eligible road projects (new and widening of existing) affected watercourse crossings, based on the topographic mapping, have been determined (current estimate =113),
- The size of the new culvert cross-sectional area has been estimated as a function of the upstream drainage area,
- All “small” crossings where the culvert will likely have a diameter smaller than 1200 mm (estimate=42) have been removed from the calculation, as those works would be assumed to be part of the road works,
- Also, any culverts previously identified in Category A (13) have not been included under this category,
- The remaining (58) culverts have been separated into three categories, based on: estimated flow conveyance area of 2 m^2, 4m^2, and 8 m^2, (26, 16, and 16 respectively); for costing purposes unit rates of $75,000, $150,000 and $300,000 per culvert/bridge respectively have been used, assuming a 26 m road width for all culverts/bridges. This cost estimate is based on concrete box culverts, and has been developed using 2004 unit rates for box sections, installation estimated at double the supply cost, and allows for an average depth of cover on each culvert.

Many of these culverts/bridges will only require lengthening, as opposed to full replacement due to hydraulic or structural deficiencies, however costs have not been separated. The cost attributable to the new development though would only be that of the widening. However, insufficient information is currently available to establish the affected number of crossings.

In several cases, however, the re-classification of the road from rural to urban, and local to collector or arterial, will necessitate an upgrade of the design criteria, and hence a larger culvert/bridge. The cost for this is currently attributed entirely to new development, however will need to be reduced to reflect the portion of the culvert that serves existing development.

3.4 Existing Agreements

As noted in Section 2, there are existing agreements (e.g. Special Policy Areas, Local Area Improvements, and Developer Agreements) in force that will need to be accounted for in the financial section of the Development Charges Update. Where it can be identified and verified by the City, existing developer contributions that have been made under existing agreements will be credited after the Development Charges are collected.

4. SUMMARY OF STORMWATER COMPONENT OF DEVELOPMENT CHARGES

4.1 Overview

The following tables present the stormwater development charges cost estimates, by Category A to E, plus GRIDS. In each table, the costs have been split into Residential and Non-Residential, providing the gross costs and the DC related costs.

Table F.2: Summary of Stormwater Development Charges Costs

Type Of Work		Gross Estimated Cost	DC Eligible Growth %	Development Charge Cost
A Channel System Improvements (Identified Projects)				
	Residential	$2,439,195	91	$2,222,558
	Non-Residential	$11,856,435	82	$9,727,642
Subtotal A		$14,295,630	84	$11,950,199
B Erosion Control – Estimated Downstream Future Works				
	Residential	$11,535,150	31	$3,610,971
	Non-Residential	$4,296,300	50	$2,127,480
Subtotal B		$15,831,450	36	$5,738,451
C Stormwater Management Quality/Quantity Facilities				
	Residential	$134,303,869	94	$126,833,417
	Non-Residential	$106,926,471	0	$0
Subtotal C		$241,230,340	53	$126,833,417
D Oversizing of trunk sewers and culverts				
	Residential	$7,554,544	100	$7,554,544
	Non-Residential	$0	0	$0
Subtotal D		$7,554,544	100	$7,554,544
E Culverts and Bridges not Previously Identified				
	Residential	$8,100,000	100	$8,100,000
	Non-Residential	$4,425,000	100	$4,425,000
Subtotal E		$12,525,000	100	$12,525,000
GRIDS Stormwater Management Quality/Quantity Facilities				
	Residential	$61,459,018	100	$61,459,018
	Non-Residential	$112,154,266	0	$0
Subtotal		$173,613,284	35	$61,459,018

Table F.2: Summary of Stormwater Development Charges Costs				
Type Of Work		**Gross Estimated Cost**	**DC Eligible Growth %**	**Development Charge Cost**
GRIDS Watercourses				
	Residential	$3,404,814	100	$3,404,814
	Non-Residential	$6,128,160	100	$6,128,160
Subtotal		$9,532,974	100	$9,532,974
TOTAL		**$474,583,221**	50	**$235,593,603**
Residential		$228,796,590		$213,185,321
Non-Residential		$245,786,631		$22,408,282

All of the proposed projects in Categories A to E and GRIDS, which have been considered for the storm drainage Development Charge, can be attributed to distinct parcels of residential and/or non-residential growth lands. These linkages form the basis for the proposed split of the total charge. For categories D, and E, in the absence of information to support the establishment of a City share, the % attributable to the City has been set at zero.

4.2 Summary

The City of Hamilton is undertaking an update to the 2011 Development Charges By-Law, and updating costs.

The City has prepared an overall report, as well as separate background reports for each service. This background report provides information for the portion of the Development Charges relating to stormwater including: erosion control, channel improvements, stormwater management works, oversizing of existing stormwater related infrastructure and stormwater related studies. Projects included in this report are future growth related which includes both planned and unplanned projects. Future growth related information has been collected from the City and other studies, and where no information was available appropriate assumptions have been made.

This report provides a summary of the approach used in establishing the Development Charges related costs and summarizing of the stormwater-related Development Charges for both residential and non-residential development.

A gross total of $474,583,221 for stormwater projects has been identified, with the portion allocated to new development totaling $235,593,603.

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WATERDOWN

STONEY CREEK MOUNTAIN

STONEY CREEK LOWER

HAMILTON MOUNTAIN

ANCASTER

MOUNT HOPE

BINBROOK

Lake Ontario

LEGEND:

- FUTURE NON-RESIDENTIAL
- FUTURE RESIDENTIAL
- RESIDENTIAL (DRAFT APPROVED AND ANTICIPATED DRAFT APPROVAL 2011-2013)
- INDUSTRIAL
- COMMERCIAL
- POTENTIAL NEW BUSINESS PARK (IN EXISTING AIRPORT SPA)
- EXPANSION TO AIRPORT SPA
- POTENTIAL URBAN BOUNDARY EXPANSION AREA
- INTENSIFICATION AREA
- NEIGHBOURHOOD BOUNDARY

STORMWATER MANAGEMENT

PROPOSED SWM FACILITIES

- QUANTITY/QUALITY
- QUALITY
- QUANTITY
- G.R.I.D.S. SWM (TBD)

EXISTING SWM FACILITIES

- QUANTITY/QUALITY
- QUALITY
- QUANTITY
- RETROFIT FOR QUALITY
- NUMBER OF FACILITY
- EXISTING CREEK
- SUBWATERSHED BOUNDARY
- IDENTIFIED EROSION CONTROL AND CHANNEL SYSTEM PROJECTS
- FUTURE EROSION CONTROL STUDY

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Hamilton

Hamilton Development Charges Background Study

Figure F1
Overall Keyplan

May 11/11 - josh.serej
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KEY PLAN

SULPHUR SPRINGS RD
SULPHUR CREEK
WILSON ST E
MAIN ST
SCENIC DR
CHEDOKE CR
MOHAWK RD
ROUSSEAUX ST
GOLF LINKS RD
STONE CHURCH RD
UPPER HORNING RD
OMNI BY
UPPER PARADISE RD
RYMAL RD W
TIFFANY CREEK
ANCASTER CREEK
SOUTHCOTE RD
MEADOWLANDS
FALKIRK WEST NEIGHBOURHOOD
FALKIRK EAST NEIGHBOURHOOD
JERSEYVILLE RD W
HIGHWAY NO. 52
WILSON ST W
SPRING VALLEY NEIGHBOURHOOD
SHAVER NEIGHBOURHOOD
GARNER NEIGHBOURHOOD
GARNER RD W
GARNER RD E
INDUSTRIAL PARK
SHAVER RD
TRINITY RD
A-1 A-11 A-12 A-20 A-22 A-23 A-24 A-25 A-26 A-27 A-28 A-29 A-6 A-8 A-9 A-13 A-14 A-15 A-16 A-17 A-21
R-22 R-3 R-70 R-71 R-72 R-55 R-60 H27 O-1a O-1b O-1c

LEGEND:

- FUTURE NON-RESIDENTIAL
- FUTURE RESIDENTIAL
- RESIDENTIAL (DRAFT APPROVED AND ANTICIPATED DRAFT APPROVAL 2011-2013)
- INDUSTRIAL
- COMMERCIAL
- POTENTIAL NEW BUSINESS PARK (IN EXISTING AIRPORT SPA)
- EXPANSION TO AIRPORT SPA
- POTENTIAL URBAN BOUNDARY EXPANSION AREA
- INTENSIFICATION AREA
- NEIGHBOURHOOD BOUNDARY

STORMWATER MANAGEMENT

PROPOSED SWM FACILITIES

- QUANTITY/QUALITY
- QUALITY
- QUANTITY
- G.R.I.D.S. SWM (TBD) (SWM 4)

EXISTING SWM FACILITIES

- QUANTITY/QUALITY
- QUALITY
- QUANTITY
- RETROFIT FOR QUALITY
- NUMBER OF FACILITY (3)
- EXISTING CREEK
- SUBWATERSHED BOUNDARY
- IDENTIFIED EROSION CONTROL AND CHANNEL SYSTEM PROJECTS
- FUTURE EROSION CONTROL STUDY

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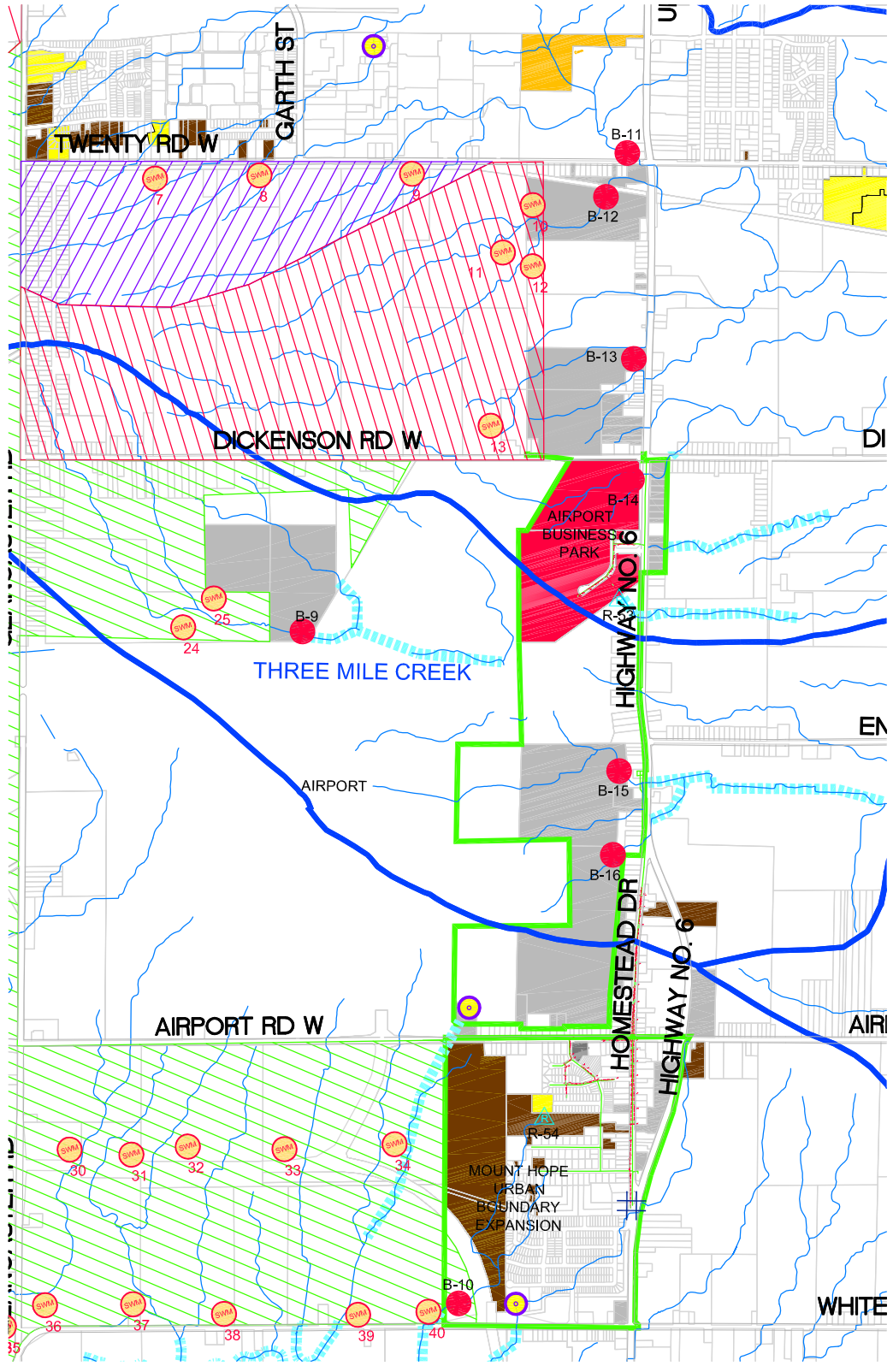
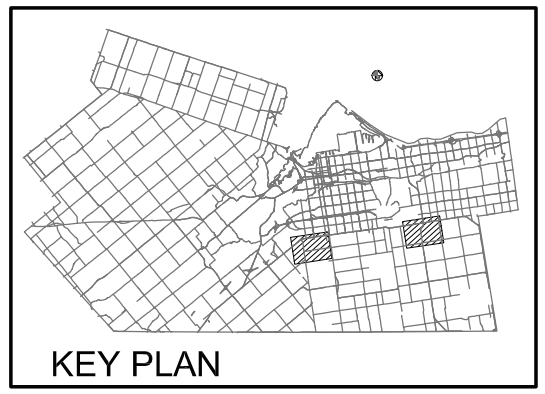
Hamilton Development Charges Background Study
Figure F2
Ancaster
Stormwater Infrastructure



MOUNT HOPE



LEGEND:

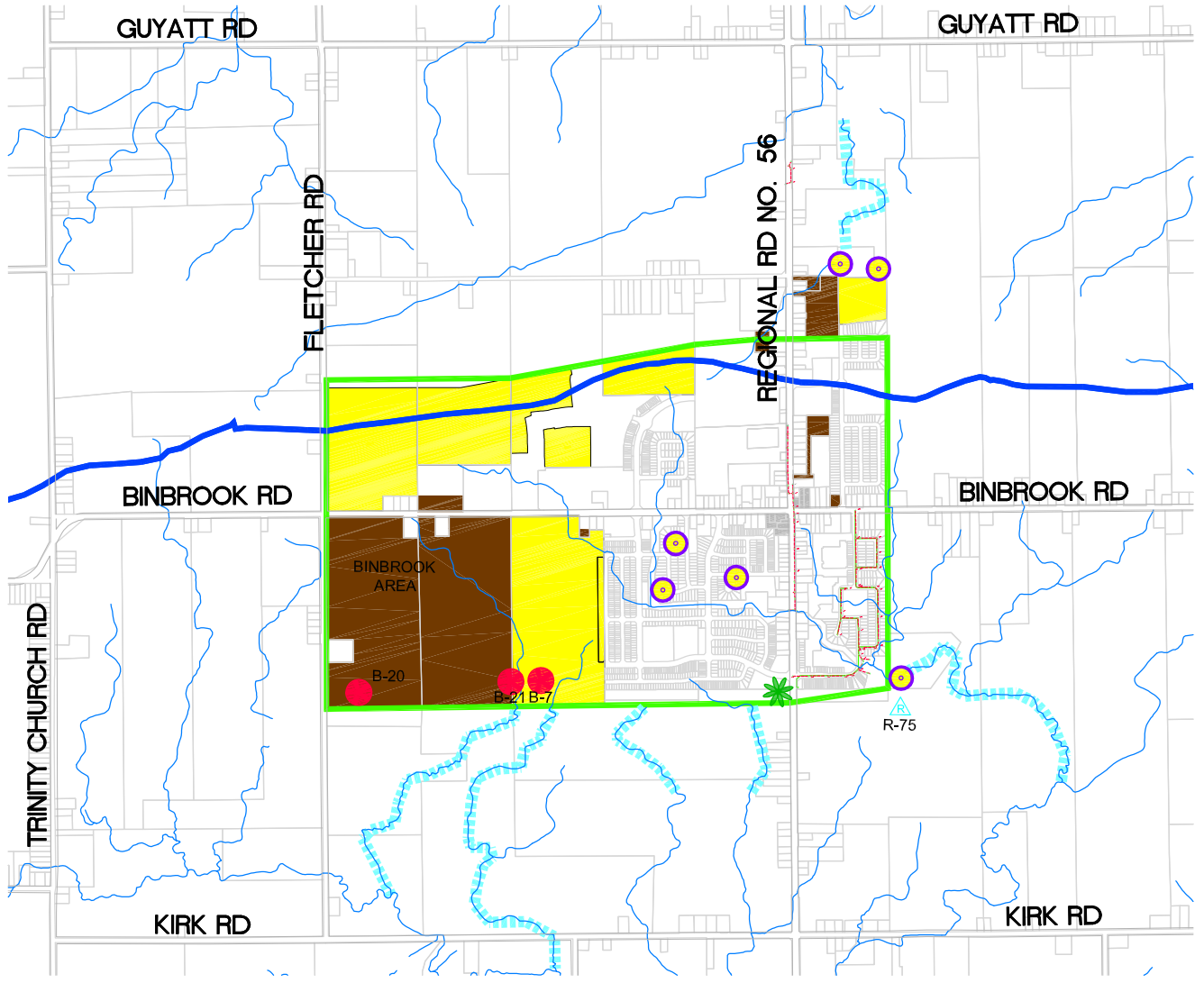
- FUTURE NON-RESIDENTIAL
- FUTURE RESIDENTIAL
- RESIDENTIAL (DRAFT APPROVED AND ANTICIPATED DRAFT APPROVAL 2011-2013)
- INDUSTRIAL
- COMMERCIAL
- POTENTIAL NEW BUSINESS PARK (IN EXISTING AIRPORT SPA)
- EXPANSION TO AIRPORT SPA
- POTENTIAL URBAN BOUNDARY EXPANSION AREA
- INTENSIFICATION AREA
- NEIGHBOURHOOD BOUNDARY

STORMWATER MANAGEMENT
PROPOSED SWM FACILITIES

- QUANTITY/QUALITY
- QUALITY
- QUANTITY
- SWM 4 G.R.I.D.S. SWM (TBD)

EXISTING SWM FACILITIES

- QUANTITY/QUALITY
- QUALITY
- QUANTITY
- RETROFIT FOR QUALITY
- 3 NUMBER OF FACILITY
- EXISTING CREEK
- SUBWATERSHED BOUNDARY
- IDENTIFIED EROSION CONTROL AND CHANNEL SYSTEM PROJECTS
- FUTURE EROSION CONTROL STUDY



BINBROOK

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Hamilton Development Charges Background Study
Figure F3
Binbrook / Mount Hope Stormwater Infrastructure

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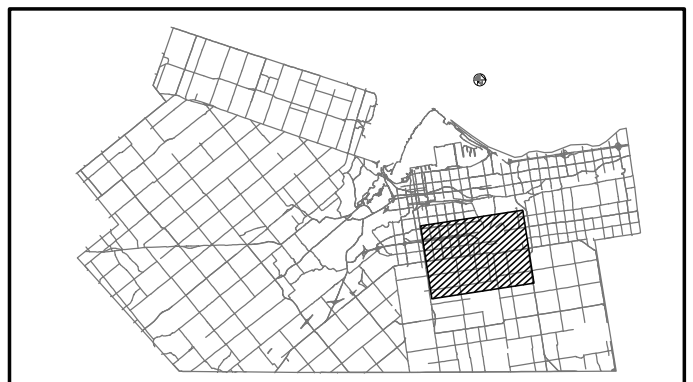
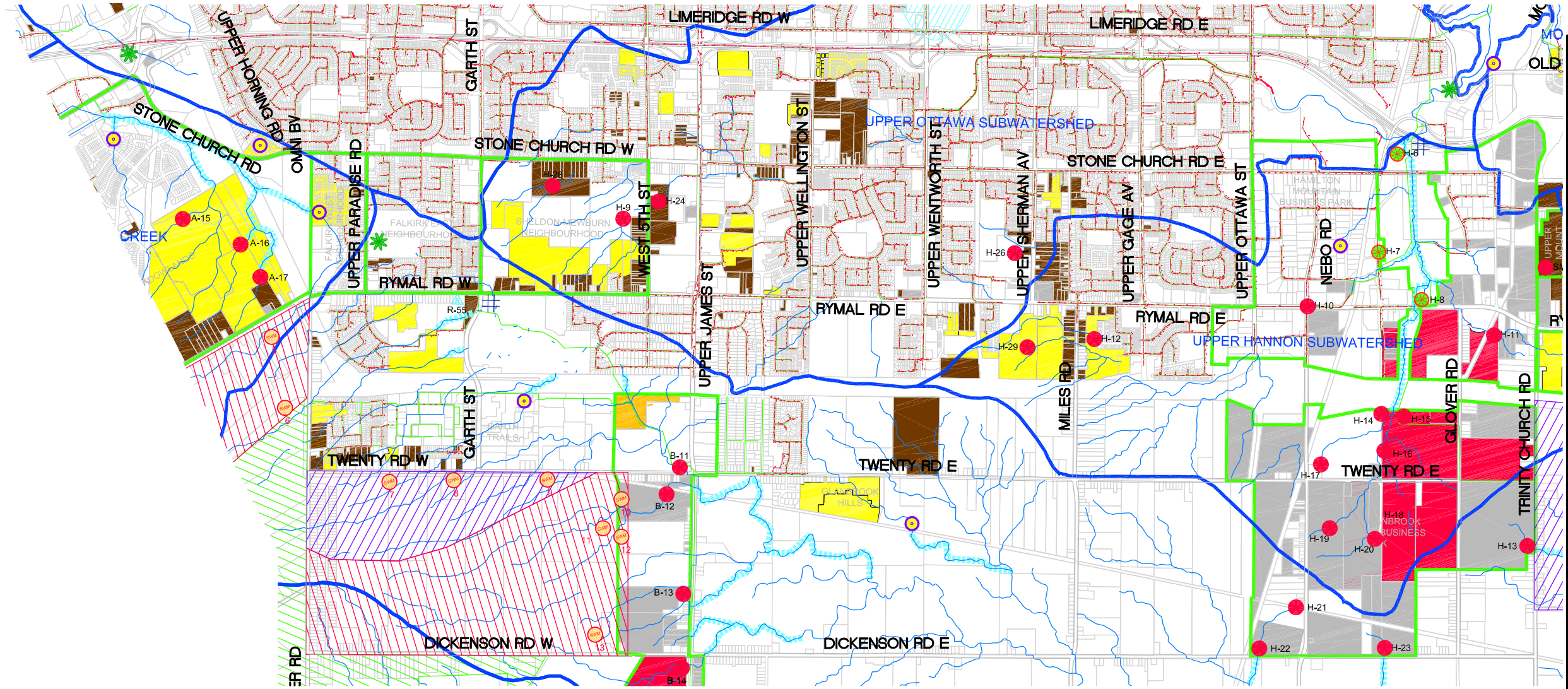


KEY PLAN



LEGEND:

- FUTURE NON-RESIDENTIAL
- FUTURE RESIDENTIAL
- RESIDENTIAL (DRAFT APPROVED AND ANTICIPATED DRAFT APPROVAL 2011-2013)
- INDUSTRIAL
- COMMERCIAL
- POTENTIAL NEW BUSINESS PARK (IN EXISTING AIRPORT SPA)
- EXPANSION TO AIRPORT SPA
- POTENTIAL URBAN BOUNDARY EXPANSION AREA
- INTENSIFICATION AREA
- NEIGHBOURHOOD BOUNDARY

STORMWATER MANAGEMENT
PROPOSED SWM FACILITIES

- QUANTITY/QUALITY
- QUALITY
- QUANTITY
- G.R.I.D.S. SWM (TBD)

EXISTING SWM FACILITIES

- QUANTITY/QUALITY
- QUALITY
- QUANTITY
- RETROFIT FOR QUALITY
- NUMBER OF FACILITY
- EXISTING CREEK
- SUBWATERSHED BOUNDARY
- IDENTIFIED EROSION CONTROL AND CHANNEL SYSTEM PROJECTS
- FUTURE EROSION CONTROL STUDY

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Hamilton Development Charges Background Study
Figure F4
Hamilton Mountain Stormwater Infrastructure

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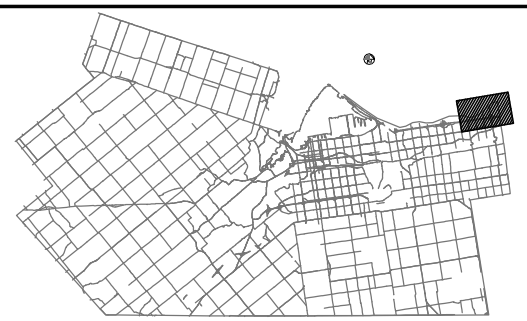


KEY PLAN

LEGEND:

- FUTURE NON-RESIDENTIAL
- FUTURE RESIDENTIAL
- RESIDENTIAL (DRAFT APPROVED AND ANTICIPATED DRAFT APPROVAL 2011-2013)
- ANTICIPATED DRAFT APPROVAL
- COMMUNITY DEVELOPMENT
- POTENTIAL NEW BUSINESS PARK (IN EXISTING AIRPORT SPA)
- EXPANSION TO AIRPORT SPA
- POTENTIAL URBAN BOUNDARY EXPANSION AREA
- INTENSIFICATION AREA
- NEIGHBOURHOOD BOUNDARY

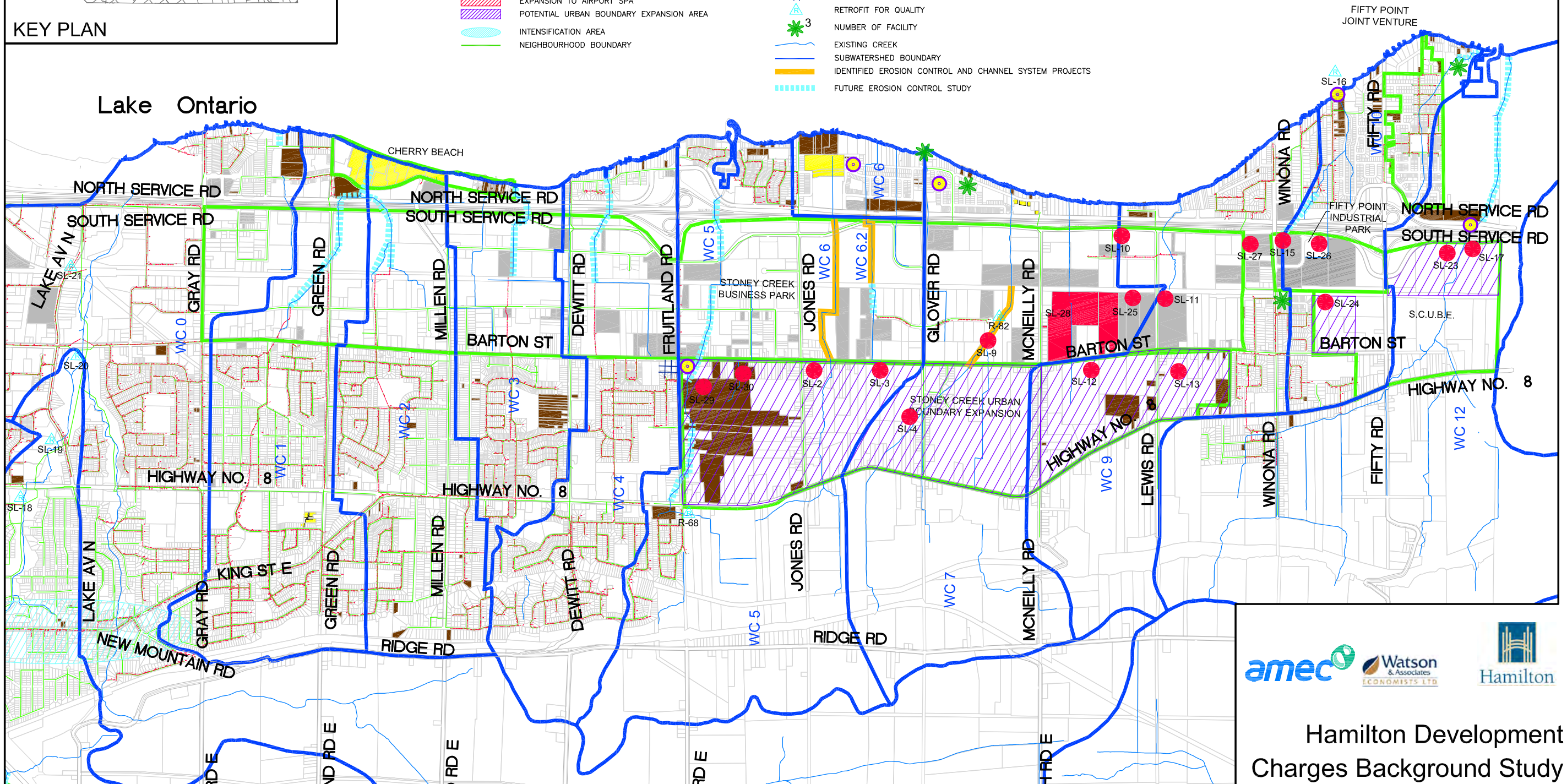
STORMWATER MANAGEMENT

PROPOSED SWM FACILITIES

- QUANTITY/QUALITY
- QUALITY
- QUANTITY
- SWM 4 G.R.I.D.S. SWM (TBD)

EXISTING SWM FACILITIES

- QUANTITY/QUALITY
- QUALITY
- QUANTITY
- RETROFIT FOR QUALITY
- 3 NUMBER OF FACILITY
- EXISTING CREEK
- SUBWATERSHED BOUNDARY
- IDENTIFIED EROSION CONTROL AND CHANNEL SYSTEM PROJECTS
- FUTURE EROSION CONTROL STUDY



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Hamilton Development Charges Background Study

Figure F5
Stoney Creek Lower Stormwater Infrastructure

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KEY PLAN

MOUNTAIN BROW BV
MOUNT ALBION RD
KING ST W
NASH ORCHARDS
LOWER DAVIS CREEK
NEW MOUNTAIN RD
GRAY RD
FIRST RD E
RIDGE RD
BATTLEFIELD CREEK
GREEN MOUNTAIN RD E
MOHAWK RD E
UPPER GAG
UPPER OTTAWA ST
LIMERIDGE RD E
PARAMOUNT DR
MONTGOMERY CREEK
OLD MUD ST
MUD ST WEST
MUD ST W
MUD ST E
FIRST RD W
UPPER CENTENNIAL PY
FELKER NEIGHBOURHOOD
UPPER DAVIS CREEK
HIGHLAND RD W
HIGHLAND RD E
FELKER S
STONE CHURCH RD E
UPPER SHERMAN AV
UPPER GAGE AV
HAMILTON MOUNTAIN BUSINESS PARK
NEBO RD
RYMAL RD E
UPPER HANNON SUBWATERSHED
MILES RD
GLOVER RD
CHURCH RD
R.O.P.A. # 9
SM-1
SM-2
SM-3
SM-4
SM-5 NASH NEIGHBOURHOOD
SM-8
SM-10
SM-13
SM-14
SM-17
SM-18
SM-19
H-7
H-8
H-10
H-11
H-12
H-14
H-15
H-16
H-26
H-29
H-30
R-65
R-67
R-69

LEGEND:

- FUTURE NON-RESIDENTIAL
- FUTURE RESIDENTIAL
- RESIDENTIAL (DRAFT APPROVED AND ANTICIPATED DRAFT APPROVAL 2011-2013)
- INDUSTRIAL
- COMMERCIAL
- POTENTIAL NEW BUSINESS PARK (IN EXISTING AIRPORT SPA)
- EXPANSION TO AIRPORT SPA
- POTENTIAL URBAN BOUNDARY EXPANSION AREA
- INTENSIFICATION AREA
- NEIGHBOURHOOD BOUNDARY

STORMWATER MANAGEMENT

PROPOSED SWM FACILITIES

- QUANTITY/QUALITY
- QUALITY
- QUANTITY
- G.R.I.D.S. SWM (TBD)

EXISTING SWM FACILITIES

- QUANTITY/QUALITY
- QUALITY
- QUANTITY
- RETROFIT FOR QUALITY
- NUMBER OF FACILITY
- EXISTING CREEK
- SUBWATERSHED BOUNDARY
- IDENTIFIED EROSION CONTROL AND CHANNEL SYSTEM PROJECTS
- FUTURE EROSION CONTROL STUDY

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Hamilton Development Charges Background Study
Figure F6
Stoney Creek Mountain Stormwater Infrastructure

KEY PLAN

CONCESSION 5 E
HIGHWAY NO. 6
CENTRE RD
ROBSON RD
PARKSIDE DR
MAIN ST N
WATERDOWN NORTH (OPA 28)
W-18
W-19
W-20
W-21
W-10
CLAPPISON INDUSTRIAL PARK
W-12
HIGHWAY NO. 5 E
HOWARD BV
DRAFT SUBDIVISION PLAN
UPCOUNTRY ESTATES
KERNS RD
W-1
W-2
W-3
W-4
W-5
W-6
WATERDOWN SOUTH (OPA 28)
SNAKE RD
THOMSON DR
MOUNTAIN BROW RD
KING RD
MILL ST S
GRINDSTONE CREEK
FALCON CREEK
BORER'S CREEK
SYDENHAM RD
LAFROLE SIDE RD
ROCK CHAPEL RD
PATTERSON RD
VALLEY RD
YORK RD
OLD GUELPH RD
HIGHWAY NO. 6
R-35

LEGEND:

- FUTURE NON-RESIDENTIAL
- FUTURE RESIDENTIAL
- RESIDENTIAL (DRAFT APPROVED AND ANTICIPATED DRAFT APPROVAL 2011-2013)
- INDUSTRIAL
- COMMERCIAL
- POTENTIAL NEW BUSINESS PARK (IN EXISTING AIRPORT SPA)
- EXPANSION TO AIRPORT SPA
- POTENTIAL URBAN BOUNDARY EXPANSION AREA
- INTENSIFICATION AREA
- NEIGHBOURHOOD BOUNDARY

STORMWATER MANAGEMENT

PROPOSED SWM FACILITIES

- QUANTITY/QUALITY
- QUALITY
- QUANTITY

EXISTING SWM FACILITIES

- QUANTITY/QUALITY
- QUALITY
- QUANTITY
- RETROFIT FOR QUALITY
- NUMBER OF FACILITY
- EXISTING CREEK
- SUBWATERSHED BOUNDARY
- IDENTIFIED EROSION CONTROL AND CHANNEL SYSTEM PROJECTS
- FUTURE EROSION CONTROL STUDY

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Hamilton Development Charges Background Study
Figure F7
Waterdown Stormwater Infrastructure

APPENDIX F-1
DETAILED LIST OF SUBWATERSHED AREAS

APPENDIX F-1: FUTURE DEVELOPMENT ACCORDING TO SUBWATERSHEDS										
Subwatersheds (Ref. Figures F1 to F7)	**Watershed**	**Primary Development Area**	**Watershed Area[1]**	**Existing Development Area (ha)**		**Future Development Area (ha)**		**Future Development Fraction**	**Remarks**	**Conservation Authority**
			A	**B**	**C**	**D**	**E**	**F = 100 X (B+C+D+E) / A**		
			(ha)	**Res.**	**Non-Res.**	**Res.**	**Non-Res.**	**(%)**		
Big Creek (Outlet #1 & #2 Industrial Park)	Big Creek	ANC	271	-	11.6	10.5	16.09	9.81		Grand River
Big Creek (Spring Valley West and Shaver Neighbourhood)	Big Creek	ANC	333	221.43		13.57		4.08	South of Shaver Neighbourhood	Grand River
Big Creek (Spring Valley West and Shaver Neighbourhood)	Big Creek	ANC	100	70.92		22.08		22.08		Grand River
Garner Neighbourhood	Hamilton Harbour - Ancaster Creek	ANC	300	53		10.02		3.34		Hamilton
Sulphur Creek	Hamilton Harbour - Spencer Creek	ANC	1794					0.00		Hamilton
Three Mile Creek	Twenty Mile Creek	ANC	165		20		145	87.88	Part of Airport Business Park and Airport	NPCA
Tiffany Creek	Hamilton Harbour - Ancaster Creek	ANC	130	51.67		78.32		60.25	Meadowlands, Garner, Ancaster. A portion of the w/c is lined in a SWMF	Hamilton

APPENDIX F-1: FUTURE DEVELOPMENT ACCORDING TO SUBWATERSHEDS										
Subwatersheds (Ref. Figures F1 to F7)	**Watershed**	**Primary Development Area**	**Watershed Area[1]**	**Existing Development Area (ha)**		**Future Development Area (ha)**		**Future Development Fraction**	**Remarks**	**Conservation Authority**
			A	**B**	**C**	**D**	**E**	**F = 100 X (B+C+D+E) / A**		
			(ha)	**Res.**	**Non-Res.**	**Res.**	**Non-Res.**	**(%)**		
Binbrook Node B	Welland River	BMH	200	191.27		8.73		4.37	Binbrook Urban area of 200 ha Draining at Node 'B'	NPCA
Binbrook Node C	Welland River	BMH	7			7		100.00		NPCA
Binbrook Node D	Welland River	BMH	133			133		100.00	Three tributaries B7-a,b,c	NPCA
Binbrook Node G	Twenty Mile Creek	BMH	50	50				0.00	Jackson Heights etc	NPCA
Node of Welland River north of Mount Hope Urban Boundary SWMF # B-17	Welland River	BMH	30				30	100.00		NPCA
Node of Welland River south of Mount Hope Urban Boundary SWMF # B-10	Welland River	BMH	220	128.52	20	31.47		14.30	Mount Hope & adjacent areas (incl. Airport Busi. Area)-two outlet	NPCA

APPENDIX F-1: FUTURE DEVELOPMENT ACCORDING TO SUBWATERSHEDS										
Subwatersheds (Ref. Figures F1 to F7)	**Watershed**	**Primary Development Area**	**Watershed Area[1]**	**Existing Development Area (ha)**		**Future Development Area (ha)**		**Future Development Fraction**	**Remarks**	**Conservation Authority**
			A	**B**	**C**	**D**	**E**	**F = 100 X (B+C+D+E) / A**		
			(ha)	**Res.**	**Non-Res.**	**Res.**	**Non-Res.**	**(%)**		
Big Creek (Outlet #1 & #2 Industrial Park)	Big Creek	ANC	271	-	11.6	10.5	16.09	9.81		Grand River
Hannon Creek subwatershed	Red Hill Creek	HAM	1070	115.2	357.7	72.1	419.9	45.98		Hamilton
Montgomery Creek	Red Hill Creek	HAM	318	108.1		13.9	15.0	9.09	Category A - Specific study completed	Hamilton
Node Downstream of SWMF # B 10	Twenty Mile Creek	HAM	40			27.5		68.75		NPCA
Node Downstream of SWMF # B 11 & B 12	Twenty Mile Creek	HAM	700	282.29		97.74	59.34	22.44		NPCA
Node Downstream of SWMF # B 13	Twenty Mile Creek	HAM	30	4.63			25.37	84.57		NPCA
Node Downstream of SWMF # H 21&22	Twenty Mile Creek	HAM	61.9				61.9	100.00		NPCA

APPENDIX F-1: FUTURE DEVELOPMENT ACCORDING TO SUBWATERSHEDS										
Subwatersheds (Ref. Figures F1 to F7)	**Watershed**	**Primary Development Area**	**Watershed Area[1]**	**Existing Development Area (ha)**		**Future Development Area (ha)**		**Future Development Fraction**	**Remarks**	**Conservation Authority**
			A	**B**	**C**	**D**	**E**	**F = 100 X (B+C+D+E) / A**		
			(ha)	**Res.**	**Non-Res.**	**Res.**	**Non-Res.**	**(%)**		
Big Creek (Outlet #1 & #2 Industrial Park)	Big Creek	ANC	271	-	11.6	10.5	16.09	9.81		Grand River
Node Downstream of SWMF # H 23	Twenty Mile Creek	HAM	40				20	50.00		NPCA
Node Downstream of SWMF # H 13	Twenty Mile Creek	HAM	29.1				29.1	100.00		NPCA
Node Downstream of SWMF # H4	Twenty Mile Creek	HAM	50	20		25		50.00	Garth Trail, North Glenbrook Ind. Pk., Airport Ind. Pk., part of Binbrook & others	NPCA
Tiffany Creek	Hamilton Harbour - Ancaster Creek	HAM	11	6.5		4.5		40.73	Falkirk West and Bayview Glen Estates	Hamilton
Upper Ottawa subwatershed	Red Hill Creek	HAM	1356	766	308.9	134.6		9.93	Erosion works downstream identified in previous studies	Hamilton
Central Business Subwatershed	Hamilton Harbour - Central Business Subwatershed	OTH	2400					0.00		Hamilton

APPENDIX F-1: FUTURE DEVELOPMENT ACCORDING TO SUBWATERSHEDS										
Subwatersheds (Ref. Figures F1 to F7)	**Watershed**	**Primary Development Area**	**Watershed Area[1]**	**Existing Development Area (ha)**		**Future Development Area (ha)**		**Future Development Fraction**	**Remarks**	**Conservation Authority**
			A	**B**	**C**	**D**	**E**	**F = 100 X (B+C+D+E) / A**		
			(ha)	**Res.**	**Non-Res.**	**Res.**	**Non-Res.**	**(%)**		
Big Creek (Outlet #1 & #2 Industrial Park)	Big Creek	ANC	271	-	11.6	10.5	16.09	9.81		Grand River
Chedoke Creek	Hamilton Harbour - Others	OTH	2706					0.00		Hamilton
Green Hill subwatershed	Red Hill Creek	OTH	1225	1102.5				0.00		Hamilton
Logies Creek	Hamilton Harbour - Others	OTH	1217					0.00		Hamilton
Lower Spencer Creek	Hamilton Harbour - Others	OTH	277					0.00		Hamilton
Mid Spencer Creek	Hamilton Harbour - Others	OTH	5513					0.00		Hamilton
Spring Creek	Hamilton Harbour - Others	OTH	1305					0.00		Hamilton

APPENDIX F-1: FUTURE DEVELOPMENT ACCORDING TO SUBWATERSHEDS										
Subwatersheds (Ref. Figures F1 to F7)	**Watershed**	**Primary Development Area**	**Watershed Area[1]**	**Existing Development Area (ha)**		**Future Development Area (ha)**		**Future Development Fraction**	**Remarks**	**Conservation Authority**
			A	**B**	**C**	**D**	**E**	**F = 100 X (B+C+D+E) / A**		
			(ha)	**Res.**	**Non-Res.**	**Res.**	**Non-Res.**	**(%)**		
Big Creek (Outlet #1 & #2 Industrial Park)	Big Creek	ANC	271	-	11.6	10.5	16.09	9.81		Grand River
Sydenham Creek	Hamilton Harbour - Others	OTH	442					0.00		Hamilton
Battlefield Creek	Lake Ontario (Battle Creek, SC, WC 0-12)	SCL	30			25.1		83.70	Nash	Hamilton
Fifty Point Joint Venture	Lake Ontario (Battle Creek, SC, WC 0-12)	SCL	45	32		1.7		3.78		Hamilton
Water Course 0	Lake Ontario (Battle Creek, SC, WC 0-12)	SCL	321	112.9	149.7	4.8	50.1	17.10		Hamilton
Water Course 1	Lake Ontario (Battle Creek, SC, WC 0-12)	SCL	330	157.5	61	4.4	2.6	2.12		Hamilton
Water Course 12	Lake Ontario (Battle Creek, SC, WC 0-12)	SCL	642	75.8	14.1	100.0		15.58		Hamilton

APPENDIX F-1: FUTURE DEVELOPMENT ACCORDING TO SUBWATERSHEDS										
Subwatersheds (Ref. Figures F1 to F7)	**Watershed**	**Primary Development Area**	**Watershed Area[1]**	**Existing Development Area (ha)**		**Future Development Area (ha)**		**Future Development Fraction**	**Remarks**	**Conservation Authority**
			A	**B**	**C**	**D**	**E**	**F = 100 X (B+C+D+E) / A**		
			(ha)	**Res.**	**Non-Res.**	**Res.**	**Non-Res.**	**(%)**		
Big Creek (Outlet #1 & #2 Industrial Park)	Big Creek	ANC	271	-	11.6	10.5	16.09	9.81		Grand River
Water Course 2	Lake Ontario (Battle Creek, SC, WC 0-12)	SCL	283	148	76.8	5.6	4.1	3.43		Hamilton
Water Course 3	Lake Ontario (Battle Creek, SC, WC 0-12)	SCL	190	74.4	73.3		12.5	6.58	w/c 5.1-1100m, w/c 5.0-2500	Hamilton
Water Course 4	Lake Ontario (Battle Creek, SC, WC 0-12)	SCL	376	133.9	60.9		94.4	25.11		Hamilton
Water Course 5	Lake Ontario (Battle Creek, SC, WC 0-12)	SCL	636	121.4	112.9		57.3	9.01	Erosion work d/s identified in previous study	Hamilton
Water Course 6	Lake Ontario (Battle Creek, SC, WC 0-12)	SCL	67	19	18.1	18.9	0.5	28.96	Erosion work d/s identified in previous study	Hamilton
Water Course 7	Lake Ontario (Battle Creek, SC, WC 0-12)	SCL	421	77.2	28.2		60.4	14.35	Erosion work d/s identified in previous study	Hamilton

APPENDIX F-1: FUTURE DEVELOPMENT ACCORDING TO SUBWATERSHEDS										
Subwatersheds (Ref. Figures F1 to F7)	**Watershed**	**Primary Development Area**	**Watershed Area[1]**	**Existing Development Area (ha)**		**Future Development Area (ha)**		**Future Development Fraction**	**Remarks**	**Conservation Authority**
			A	**B**	**C**	**D**	**E**	**F = 100 X (B+C+D+E) / A**		
			(ha)	**Res.**	**Non-Res.**	**Res.**	**Non-Res.**	**(%)**		
Big Creek (Outlet #1 & #2 Industrial Park)	Big Creek	ANC	271	-	11.6	10.5	16.09	9.81		Grand River
Water Course 9	Lake Ontario (Battle Creek, SC, WC 0-12)	SCL	579	148.76	51.2	39	70.8	18.96		Hamilton
Davis Creek (Lower)	Red Hill Creek	SCM	933	492.26		207.74		22.27	Drainage area is from Upper Davis	Hamilton
Red Hill Valley subwatershed	Red Hill Creek	SCM	1290	0.6		2.4		0.19	Erosion work d/s identified in previous Red Hill Creek Watershed Study	Hamilton
ROPA #9 - Upper Davis Creek	Red Hill Creek	SCM	112	54.1		57.9		51.70	Two tributaries part of ROPA # 9	Hamilton
Sinkhole Creek	Twenty Mile Creek	SCM	140	63.1		74.9		53.50	Felkerk South and ROPA #9 (Rymal Rd.)	NPCA
Falcon Creek	North Shore Watersheds	WAT	48			22.0		45.83	OPA 28 South	Halton

APPENDIX F-1: FUTURE DEVELOPMENT ACCORDING TO SUBWATERSHEDS										
Subwatersheds (Ref. Figures F1 to F7)	**Watershed**	**Primary Development Area**	**Watershed Area[1]**	**Existing Development Area (ha)**		**Future Development Area (ha)**		**Future Development Fraction**	**Remarks**	**Conservation Authority**
			A	**B**	**C**	**D**	**E**	**F = 100 X (B+C+D+E) / A**		
			(ha)	**Res.**	**Non-Res.**	**Res.**	**Non-Res.**	**(%)**		
Big Creek (Outlet #1 & #2 Industrial Park)	Big Creek	ANC	271	-	11.6	10.5	16.09	9.81		Grand River
Flamborough Industrial Park SWMF # W14	North Shore Watersheds	WAT	45			45		100.00	Grindstone Creek	Halton
Grindstone Creek SWMF # W1 to SWMF # W4, W7	North Shore Watersheds	WAT	1011	254.8		70.2		6.94	OPA 28 South and Upcountry Estates, Gatesbury, etc.	Halton
Grindstone Creek SWMF # W5	North Shore Watersheds	WAT	45			45		100.00		Halton
Indian Creek	North Shore Watersheds	WAT	80			10.91		13.64	OPA 28 South	Halton
Borer's Creek	North Shore Watersheds	WAT / OTH	734	179.6	47.1	101.4	137.9	32.60	OPA 28 North, Clappison, Waterdown	Halton
Fifty Point Industrial Park	Lake Ontario (Battle Creek, SC, WC 0-12)	SCL	20				19.1	95.50		Hamilton
		TOTALS	***30902***	***5317.35***	***1411.5***	***1527.02***	***1331.35***			

APPENDIX F-2
COST SUMMARY SHEETS – DETAILED BY CATEGORY

APPENDIX F-2: CATEGORY A - OPEN WATERCOURSES: CHANNEL SYSTEM IMPROVEMENTS (IDENTIFIED PROJECTS) RESIDENTIAL

Category			Project Title	Year	Drainage Area (ha)	Purpose	SWMF/ Drainage Work						Estimated Total Cost ($)	Growth Related %	Net Total Cost ($)	Remarks
Primary Dev. Areas	Build Out (yr)	Secondary					Type of Work	Location of Work	Type	Description	Length (m)	2011 Estimated Capital Cost ($)				
ANC	6-10	A	Garner neighbourhood supplemental downstream erosion assessment	2003	145	Erosion Control and Channel System Improvements	Channel Improvement			Length of channel improvement work	1,100	278,600	278,600	50	139,300	
BMH	11+	A	Binbrook Urban Settlement Area & South Brook on the Glanbrook Stormwater Management Report		25	Erosion Control and Channel System Improvements	Existing watercourses at the north of Binbrook Rd will be replaced with storm sewers and to the south will be lined			Length of channel improvement work	1,200	2,005,920	2,005,920	100	2,005,920	
SCL	11+	A	Master Drainage Plan Area No. 5, 6, 7. City of Stoney Creek			Erosion Control and Channel System Improvements	Lower culvert by 0.4 m - South Service Rd. under w/c #6					154,675	154,675	50	77,338	Reported erosion costs adjusted to 2011
Total Residential												**2,439,195**	**2,439,195**	**91**	**2,222,558**	

ANC: Ancaster
BMH: Binbrook / Mount Hope
HAM: Hamilton Mountain
SCL: Stoney Creek - Lower
SCM: Stoney Creek - Mountain
WAT: Waterdown

APPENDIX F-2: CATEGORY A - OPEN WATERCOURSES: CHANNEL SYSTEM IMPROVEMENTS (IDENTIFIED PROJECTS) NON-RESIDENTIAL

Category			Project Title	Year	Drainage Area (ha)	Purpose	SWMF/ Drainage Work					2011 Estimated Capital Cost ($)	Estimated Total Cost ($)	Growth Related %	Net Total Cost ($)	Remarks
Primary Dev. Areas	Build Out (yr)	Secondary					Type of Work	Location of Work	Type	Description	Length (m)					
ANC	11+	A	Stormwater Management Report - Update Ancaster Industrial Park Drainage Area 1	Dec. 2002	102	Erosion protection				Length of channel =	204	341,006	341,006	100	341,006	Cost Estimated values
ANC	11+	A	Stormwater Management Report - Update Ancaster Industrial Park Drainage Area 2	Dec. 2002	142	Erosion protection				Length of channel =	284	474,734	474,734	100	474,734	Estimated values
SCL	11+	A	Master Drainage Plan Area No. 5, 6, 7. City of Stoney Creek	1990			Culvert replacement - Barton St. on w/c #6					180,504	180,504	100	180,504	Reported erosion costs adjusted to 2011
SCL	11+	A	Master Drainage Plan Area No. 5, 6, 7. City of Stoney Creek	1990			New culvert - Arvin Ave. on w/c #6					160,322	160,322	100	160,322	Reported erosion costs adjusted to 2011
SCL	11+	A	Master Drainage Plan Area No. 5, 6, 7. City of Stoney Creek	1990			Triple-Culvert replacement - QEW Corridor at w/c #5					1,855,784	1,855,784	100	1,855,784	Reported erosion costs adjusted to 2011
SCL	11+	A	Master Drainage Plan Area No. 5, 6, 7. City of Stoney Creek	1990			New culvert - North Service Rd. at w/c #5					308,221	308,221	100	308,221	Reported erosion costs adjusted to 2011
SCL	11+	A	Creek System Improvement W/C 7	2003			Lower culvert by 0.4 m - South Service Rd. under w/c #6					154,675	154,675	50	77,338	Reported erosion costs adjusted to 2011
SCL	11+	A	Master Drainage Plan Area No. 5, 6, 7. City of Stoney Creek	1990			Culvert replacement - Barton St. on east branches of w/c #7					158,653	158,653	100	158,653	Reported erosion costs adjusted to 2011
SCL	11+	A	Creek System Improvement W/C 7	2003			Culvert replacement - Barton St. on west branches of w/c #7					158,653	158,653	100	158,653	Reported erosion costs adjusted to 2011
SCL	0-5	A	Creek System Improvement W/C 7	2003			Culvert replacement - CNR on w/c #7					392,826	392,826	100	392,826	Reported erosion costs adjusted to 2011
SCL	11+	A	Master Drainage Plan Area No. 5, 6, 7. City of Stoney Creek	1990			Culvert replacement - QEW Corridor on w/c #6.2					684,990	684,990	100	684,990	Reported erosion costs adjusted to 2011
SCL	11+	A	Water Course 5- Master Drainage Plan Area No. 5, 6, 7. City of Stoney Creek	1990	582		Lined Channel			Length of channel improvement work	1015	3,044,402	3,044,402	100	3,044,402	Reported erosion costs adjusted to 2011
SCL	11+	A	Master Drainage Plan Area No. 5, 6, 7. City of Stoney Creek	1990			Culvert replacement - Barton St. on w/c #5					228,085	228,085	20	45,617	Reported erosion costs adjusted to 2011
SCL	11+	A	Master Drainage Plan Area No. 5, 6, 7. City of Stoney Creek	1990			Lower culvert by 1.6 m - Arvin Ave. on w/c #5					82,493	82,493	20	16,499	Reported erosion costs adjusted to 2011
SCL	11+	A	Master Drainage Plan Area No. 5, 6, 7. City of Stoney Creek	1990			Culvert replacement - CNR line on w/c #5					215,956	215,956	20	43,191	Reported erosion costs adjusted to 2011
SCL	11+	A	Water Course 6 - Master Drainage Plan Area No. 5, 6, 7. City of Stoney Creek	1990	67		Lined Channel			Length of channel improvement work	1077	3,260,456	3,260,456	50	1,630,228	Reported erosion costs adjusted to 2011
SCL	11+	A	Master Drainage Plan Area No. 5, 6, 7. City of Stoney Creek	1990			Lower culvert by 1.84 m - South Service Rd. under w/c #5					154,675	154,675	100	154,675	Reported erosion costs adjusted to 2011
Total Non-Residential												**11,856,435**	**11,856,435**	**82**	**9,727,642**	
Grand Total												**14,295,630**	**14,295,630**	**84**	**11,950,199**	

ANC: Ancaster
BMH: Binbrook / Mount Hope
HAM: Hamilton Mountain
SCL: Stoney Creek - Lower
SCM: Stoney Creek - Mountain
WAT: Waterdown

APPENDIX F-2 CATEGORY B: OFF SITE EROSION WORKS NOT IDENTIFIED IN PREVIOUS STUDIES (RESIDENTIAL & NON RESIDENTIAL)

Subwatershed	Watershed	Primary Development Area	Watershed Area[1]	Existing Development Area (ha)		Future Development Area (ha)		Development Fraction	Fraction of Watercourse Assumed to Required Erosion Control[2]	Total Length of Downstream Watercourse to Assumed End-Point[3]	Length of Erosion Control Works	Cost[4]	Land Cost	Total Cost	New Development Fraction	Development Related Cost	Remarks
			A	B	C	D	E	F = 100 X (B+C+D+E) / A	G	H	I = G X H	J	K	L=J+K	M = (D+E) / A	L X M	
				Res.	Non-Res.	Res.	Non-Res.										
			(ha)	(ha)	(ha)	(ha)	(ha)	(%)		(m)	(m)	($)	($)	($)		($)	
Garner Neighbourhood	Coote's Paradise	ANC	300	53		48		33.67	0.05	1,100	55	$41,250	$24,750	$66,000	0.16	$10,560	Garner, Ancaster (1100 m additional work is previously identified
Big Creek (Outlet #1 & #2 Industrial Park)	Big Creek	ANC	271		11.6	10.5	16.09	14.09	0.05	4,500	225	$168,750	$101,250	$270,000	0.10	$26,492	
Big Creek (Spring Valley West and Shaver Neighbourhood)	Big Creek	ANC	333	221.43		13.57		70.57	0.15	3,200	480	$360,000	$216,000	$576,000	0.04	$23,472	South of Shaver Neighbourhood
Big Creek (Spring Valley West and Shaver Neighbourhood)	Big Creek	ANC	100	70.92		22.06		92.98	0.20	1,500	300	$225,000	$135,000	$360,000	0.22	$79,416	
Three Mile Creek	Twenty Mile Creek	ANC	165		20		145	100.00	0.20	1,500	300	$225,000	$135,000	$360,000	0.88	$316,364	Part of Airport Business Park and Airport
Tiffany Creek	Coote's Paradise	ANC	130	51.67		78.32		99.99	0.20	2,500	500	$375,000	$225,000	$600,000	0.60	$361,477	Meadowlands, Garner, Ancaster. A portion of the w/c is lined in a SWMF
Tiffany Creek	Coote's Paradise	HAM	11			11		100.00	0.20	450	90	$67,500	$40,500	$108,000	1.00	$108,000	Falkirk West and Bayview Glen Estates
Sulphur Creek	Coote's Paradise	ANC	1794			32		1.78	0.05	500	25	$37,500	$11,250	$48,750	0.02	$870	
Binbrook Node B	Welland River	BMH	200	191.27		8.73		100.00	0.20	4,500	900	$675,000	$324,000	$999,000	0.04	$43,606	Binbrook Urban area of 200 ha Draining at Node 'B'
Binbrook Node C	Welland River	BMH	7			7		100.00	0.20	300	60	$45,000	$21,600	$66,600	1.00	$66,600	
Binbrook Node D	Welland River	BMH	133			133		100.00	0.20	4,100	820	$615,000	$295,200	$910,200	1.00	$910,200	Three tributaries B7-a,b,c
Binbrook Node G	Twenty Mile Creek (Three Mile, Sinkhole Creek)	BMH	50	50				100.00	0.20	750	150	$112,500	$54,000	$166,500	0.00	$0	Jackson Heights etc
Node of Welland River south of Mount Hope Urban Boundary SWMF # B-10	Welland River	BMH	220	128.52	20	31.47		81.81	0.20	1,500	300	$225,000	$108,000	$333,000	0.14	$47,634	Mount Hope & adjacent areas (including Airport Business Area)-two outlet
Node of Welland River north of Mount Hope Urban Boundary SWMF # B-17	Welland River	BMH	30				30	100.00	0.20	1,200	240	$180,000	$86,400	$266,400	1.00	$266,400	
Node Downstream of SWMF # H4	Twenty Mile Creek (Three Mile, Sinkhole Creek)	HAM	50	20		25		90.00	0.20	900	180	$135,000	$64,800	$199,800	0.50	$99,900	Garth Trail, North Glenbrook Industrial Park, Airport Industrial Business Park, part of Binbrook and others

[1]To point immediately d/s of future development (start of off-site erosion assessment)

[2]-0.05 - Where Development Fraction is 0 - 25%
0.10 - Where Development Fraction is 26 - 49%
0.15 - Where Development Fraction is 50 - 74%
0.20 - Where Development Fraction is 75 - 100%

Coote's Paradise (Borer's Creek, Spencer Creek, Sulphur Creek, Ancaster Creek, Chedoke Creek, Others)
Hamilton Harbour (Red Hill Creek, Central Business Park)

[3]Location where d/s of this point no erosion is deemed to occur from subject development; total drainage area to this point estimated as a maximum of 2X the study watershed area (Column A). Note that the end point may also be set by Hamilton Harbour or L

[4]$1500/m for Watershed Area > 500 ha
$750/m for Watershed Area < 500 ha

APPENDIX F-2 CATEGORY B: OFF SITE EROSION WORKS NOT IDENTIFIED IN PREVIOUS STUDIES (RESIDENTIAL & NON RESIDENTIAL)

Subwatershed	Watershed	Primary Development Area	Watershed Area[1]	Existing Development Area (ha)		Future Development Area (ha)		Development Fraction	Fraction of Watercourse Assumed to Required Erosion Control[2]	Total Length of Downstream Watercourse to Assumed End-Point[3]	Length of Erosion Control Works	Cost[4]	Land Cost	Total Cost	New Development Fraction	Development Related Cost	Remarks
			A	B	C	D	E	F = 100 X (B+C+D+E) / A	G	H	I = G X H	J	K	L=J+K	M = (D+E) / A	L X M	
				Res.	Non-Res.	Res.	Non-Res.										
			(ha)	(ha)	(ha)	(ha)	(ha)	(%)		(m)	(m)	($)	($)	($)		($)	
Node Downstream of SWMF # H 11	Twenty Mile Creek (Three Mile, Sinkhole Creek)	HAM	35				35	100.00	0.20	300	60	$45,000	$21,600	$66,600	1.00	$66,600	
Node Downstream of SWMF # H 12	Twenty Mile Creek (Three Mile, Sinkhole Creek)	HAM	40				40	100.00	0.20	1,350	270	$202,500	$97,200	$299,700	1.00	$299,700	
Node Downstream of SWMF # H 13	Twenty Mile Creek (Three Mile, Sinkhole Creek)	HAM	29.1				29.1	100.00	0.20	900	180	$135,000	$64,800	$199,800	1.00	$199,800	
Node Downstream of SWMF # B 14	Twenty Mile Creek (Three Mile, Sinkhole Creek)	HAM	40				40	100.00	0.20	750	150	$112,500	$54,000	$166,500	1.00	$166,500	
Node Downstream of SWMF # B 11 & B 12	Twenty Mile Creek (Three Mile, Sinkhole Creek)	HAM	700	282.29		97.74	59.34	62.77	0.15	3,000	450	$675,000	$162,000	$837,000	0.22	$187,823	
Node Downstream of SWMF # B 13	Twenty Mile Creek (Three Mile, Sinkhole Creek)	HAM	30	4.63			25.37	100.00	0.20	600	120	$90,000	$43,200	$133,200	0.85	$112,643	
Upper Ottawa subwatershed	Hamilton Harbour	HAM	1356	766	308.9	134.6		89.20	0.20	1,100	220	$330,000	$79,200	$409,200	0.10	$40,618	Erosion works downstream identified in previous studies
Hannon Creek subwatershed	Hamilton Harbour	HAM	1070	115.2	357.7	72.1	419.9	90.18	0.20	2,000	400	$600,000	$144,000	$744,000	0.46	$342,101	
Montgomery Creek	Hamilton Harbour	HAM	318	108.1		13.9	15	43.08	0.10	4,500	450	$337,500	$162,000	$499,500	0.09	$45,395	Category A - Specific study completed
Battlefield Creek	Lake Ontario (Battlefield Creek, SC, WC 0-12)	SCL	30			25.1		83.67	0.20	300	60	$45,000	$21,600	$66,600	0.84	$55,722	Nash
Water Course 0	Lake Ontario (Battlefield Creek, SC, WC 0-12)	SCL	321	112.9	149.7	4.8	50.1	98.91	0.20	0	0	$0	$0	$0	0.17	$0	WC 0
Water Course 1	Lake Ontario (Battlefield Creek, SC, WC 0-12)	SCL	330	157.5	61	4.4	2.6	68.33	0.15	1,900	285	$213,750	$102,600	$316,350	0.02	$6,710	WC 1
Fifty Point Industrial Park	Lake Ontario (Battlefield Creek, SC, WC 0-12)	Water Course 10/12	20				19.1	95.50	0.20	600	120	$90,000	$43,200	$133,200	0.96	$127,206	

[1]To point immediately d/s of future development (start of off-site erosion assessment)

[2]-0.05 - Where Development Fraction is 0 - 25%
0.10 - Where Development Fraction is 26 - 49%
0.15 - Where Development Fraction is 50 - 74%
0.20 - Where Development Fraction is 75 - 100%

Coote's Paradise (Borer's Creek, Spencer Creek, Sulphur Creek, Ancaster Creek, Chedoke Creek, Others)
Hamilton Harbour (Red Hill Creek, Central Business Park)

[3]Location where d/s of this point no erosion is deemed to occur from subject development; total drainage area to this point estimated as a maximum of 2X the study watershed area (Column A). Note that the end point may also be set by Hamilton Harbour or L

[4]$1500/m for Watershed Area > 500 ha
$750/m for Watershed Area < 500 ha

APPENDIX F-2 CATEGORY B: OFF SITE EROSION WORKS NOT IDENTIFIED IN PREVIOUS STUDIES (RESIDENTIAL & NON RESIDENTIAL)

Subwatershed	Watershed	Primary Development Area	Watershed Area[1]	Existing Development Area (ha)		Future Development Area (ha)		Development Fraction	Fraction of Watercourse Assumed to Required Erosion Control[2]	Total Length of Downstream Watercourse to Assumed End-Point[3]	Length of Erosion Control Works	Cost[4]	Land Cost	Total Cost	New Development Fraction	Development Related Cost	Remarks
			A	B	C	D	E	F = 100 X (B+C+D+E) / A	G	H	I = G X H	J	K	L=J+K	M = (D+E) / A	L X M	
				Res.	Non-Res.	Res.	Non-Res.										
			(ha)	(ha)	(ha)	(ha)	(ha)	(%)		(m)	(m)	($)	($)	($)		($)	
Fifty Point Joint Venture	Lake Ontario (Battlefield Creek, SC, WC 0-12)	SCL	45	32		1.7		74.89	0.20	300	60	$45,000	$21,600	$66,600	0.04	$2,516	
Water Course 12	Lake Ontario (Battlefield Creek, SC, WC 0-12)	SCL	642	75.8	14.1	100	0	29.58	0.10	1,350	135	$202,500	$48,600	$251,100	0.16	$39,112	WC 12
Water Course 2	Lake Ontario (Battlefield Creek, SC, WC 0-12)	SCL	283	148	76.8	5.6	4.1	82.86	0.20	1,100	220	$165,000	$79,200	$244,200	0.03	$8,370	WC 2
Water Course 3	Lake Ontario (Battlefield Creek, SC, WC 0-12)	SCL	190	74.4	73.3		12.5	84.32	0.20	900	180	$135,000	$64,800	$199,800	0.07	$13,145	WC 3
Water Course 4	Lake Ontario (Battlefield Creek, SC, WC 0-12)	SCL	376	133.9	60.9		94.4	76.91	0.20	800	160	$120,000	$57,600	$177,600	0.25	$44,589	WC 4
Water Course 5	Lake Ontario (Battlefield Creek, SC, WC 0-12)	SCL	636	121.4	112.9		57.3	45.85	0.10	3,600	360	$540,000	$129,600	$669,600	0.09	$60,327	w/c 5.1-1100m, w/c 5.0-2500
Water Course 6	Lake Ontario (Battlefield Creek, SC, WC 0-12)	SCL	67	19	18.1	18.9	0.5	84.33	0.95	1,300	1235	$926,250	$444,600	$1,370,850	0.29	$396,933	WC 6
Water Course 7	Lake Ontario (Battlefield Creek, SC, WC 0-12)	SCL	421	77.2	28.2		60.4	39.38	0.10	1,000	100	$75,000	$36,000	$111,000	0.14	$15,925	WC 7
Water Course 9	Lake Ontario (Battlefield Creek, SC, WC 0-12)	SCL	579	148.76	51.2	39	70.8	53.50	0.15	800	120	$180,000	$43,200	$223,200	0.19	$42,327	WC 9
Davis Creek (Lower)	Hamilton Harbour	SCM	933	492.26		207.74		75.03	0.20	3,000	600	$900,000	$216,000	$1,116,000	0.22	$248,486	Drainage area is from Upper Davis
Red Hill Valley subwatershed	Hamilton Harbour	SCM	1290	0.6		2.4		0.23	0.05	0	0	$0	$0	$0	0.00	$0	Erosion work d/s identified in previous Red Hill Creek Watershed Study
Sinkhole Creek	Twenty Mile Creek (Three Mile, Sinkhole Creek)	SCM	140	63.1		74.9		98.57	0.20	1,200	240	$180,000	$86,400	$266,400	0.54	$142,524	Felkirk South and ROPA #9 (Rymal Rd.)
ROPA #9 - Upper Davis Creek	Hamilton Harbour	SCM	112	54.1	-	57.9	-	100.00	0.20	1,600	320	$240,000	$115,200	$355,200	0.52	$183,626	Two tributaries part of ROPA # 9

[1]To point immediately d/s of future development (start of off-site erosion assessment)

[2]-0.05 - Where Development Fraction is 0 - 25%
0.10 - Where Development Fraction is 26 - 49%
0.15 - Where Development Fraction is 50 - 74%
0.20 - Where Development Fraction is 75 - 100%

Coote's Paradise (Borer's Creek, Spencer Creek, Sulphur Creek, Ancaster Creek, Chedoke Creek, Others)
Hamilton Harbour (Red Hill Creek, Central Business Park)

[3]Location where d/s of this point no erosion is deemed to occur from subject development; total drainage area to this point estimated as a maximum of 2X the study watershed area (Column A). Note that the end point may also be set by Hamilton Harbour or L

[4]$1500/m for Watershed Area > 500 ha
$750/m for Watershed Area < 500 ha

APPENDIX F-2 CATEGORY B: OFF SITE EROSION WORKS NOT IDENTIFIED IN PREVIOUS STUDIES (RESIDENTIAL & NON RESIDENTIAL)

Subwatershed	Watershed	Primary Development Area	Watershed Area[1]	Existing Development Area (ha)		Future Development Area (ha)		Development Fraction	Fraction of Watercourse Assumed to Required Erosion Control[2]	Total Length of Downstream Watercourse to Assumed End-Point[3]	Length of Erosion Control Works	Cost[4]	Land Cost	Total Cost	New Development Fraction	Development Related Cost	Remarks
			A	B	C	D	E	F = 100 X (B+C+D+E) / A	G	H	I = G X H	J	K	L=J+K	M = (D+E) / A	L X M	
				Res.	Non-Res.	Res.	Non-Res.										
			(ha)	(ha)	(ha)	(ha)	(ha)	(%)		(m)	(m)	($)	($)	($)		($)	
Falcon Creek	Grindstone Creek/ North Shore Watershed	WAT	48			22		45.83	0.10	1,200	120	$90,000	$54,000	$144,000	0.46	$66,000	OPA 28 South
Grindstone Creek SWMF # W7	Grindstone Creek/ North Shore Watershed	WAT	45			45		100.00	0.20	900	180	$135,000	$81,000	$216,000	1.00	$216,000	
Grindstone Creek SWMF # W1 to SWMF # W8	Grindstone Creek/ North Shore Watershed	WAT	1011	254.8		70.2		32.15	0.10	2,000	200	$300,000	$90,000	$390,000	0.07	$27,080	OPA 28 South and Upcountry Estates, Gatesbury, etc.
Flamborough Industrial Park SWMF # W14	Grindstone Creek/ North Shore Watershed	WAT	45			45		100.00	0.20	900	180	$135,000	$81,000	$216,000	1.00	$216,000	
Indian Creek	Grindstone Creek/ North Shore Watershed	WAT	80			10.91		13.64	0.05	450	23	$16,875	$10,125	$27,000	0.14	$3,682	OPA 28 South
Borer's Creek	Grindstone Creek/ North Shore Watershed	WAT / OTH	734	179.6	47.1			30.89	0.10	3,000	300	$450,000	$135,000	$585,000	0.00	$0	OPA 28 North, Clappison, Waterdown
Central Business Subwatershed	Hamilton Harbour	OTH	2400					0.00	0.00		0	$0	$0	$0	0.00	$0	Not in growth area
Chedoke Creek	Hamilton Harbour	OTH	2706					0.00	0.00		0	$0	$0	$0	0.00	$0	Not in growth area
Green Hill subwatershed	Hamilton Harbour	OTH	1225	1102.5				90.00	0.20	0	0	$0	$0	$0	0.00	$0	Not in growth area
Logies Creek	Coote's Paradise	OTH	1217					0.00	0.00		0	$0	$0	$0	0.00	$0	Not in growth area
Lower Spencer Creek	Coote's Paradise	OTH	277					0.00	0.00		0	$0	$0	$0	0.00	$0	Not in growth area
Mid Spencer Creek	Coote's Paradise	OTH	5513					0.00	0.00		0	$0	$0	$0	0.00	$0	Not in growth area
Spring Creek	Coote's Paradise	OTH	1305					0.00	0.00		0	$0	$0	$0	0.00	$0	Not in growth area
Sydenham Creek	Coote's Paradise	OTH	442					0.00	0.00		0	$0	$0	$0	0.00	$0	Not in growth area
Grand Total			**30,875.1**	**5,310.9**	**1,411.5**	**1,474.5**	**1,226.6**	**30.52**		**71,200**	**12123**	**$11,199,375**	**$4,632,075**	**$15,831,450**	**36.25**	**$5,738,451**	

[1]To point immediately d/s of future development (start of off-site erosion assessment)

[2]-0.05 - Where Development Fraction is 0 - 25%
0.10 - Where Development Fraction is 26 - 49%
0.15 - Where Development Fraction is 50 - 74%
0.20 - Where Development Fraction is 75 - 100%

Coote's Paradise (Borer's Creek, Spencer Creek, Sulphur Creek, Ancaster Creek, Chedoke Creek, Others)
Hamilton Harbour (Red Hill Creek, Central Business Park)

[3]Location where d/s of this point no erosion is deemed to occur from subject development; total drainage area to this point estimated as a maximum of 2X the study watershed area (Column A). Note that the end point may also be set by Hamilton Harbour or L

[4]$1500/m for Watershed Area > 500 ha
$750/m for Watershed Area < 500 ha

Total Residential	**$11,535,150**	**31.30**	**$3,610,971**
Total Non-Residential	**$4,296,300**	**49.52**	**$2,127,480**

APPENDIX F-2: CATEGORY C - STORMWATER MANAGEMENT (QUALITY AND OR QUANTITY) FACILITIES RESIDENTIAL

Category			SWMF #	Project Title	Year	Drainage Area (ha)	Purpose	SWMF/ Drainage Work										Growth Related %	Net GrowthTotal Assiciated Cost ($)	Existing Benefit	Direct Developer Contribution ($)	Non-Res Area Fraction Cost ($)	Net Total Associated Cost ($)	Remarks
Primary Dev. Areas	Build Out (yr)	Secondary						Type of Work	Location of Work	Type	Description	Volume (m3)	Estimated Footprint 4% (ha)	Estimated Footprint 6% (ha)	Study/Draft Plan Footprint (ha)	Land Cost	Estimated Capital Cost ($)	Estimated Total Cost Including Land						
ANC	11+	C	6	Spring Valley West and Shaver Neighbourhoods Master Drainage Plan	Aug. 1993	20	MDP to address existing and future land use consideration for Spring Valley and West Shaver Neighbourhoods	SWMF (Extended detention facility) #7	Southern end of the Neighbourhood along stream	Quantity / Quality	Storage Capacity =	8,700		1.20		1,334,340	570,000	1,904,340	100	1,904,340	-	-	-	1,904,340	listed as committed/actual in 2009
ANC	11+	C	7	Garner Neighbourhood Master Drainage Plan. Ancaster	July. 1996 Rev. Nov. 2003	10.4	MDP addressing drainage related issues for existing and future development	Proposed Quality Facility #1: Extended detention wetland	Between proposed Highway 6 (new) interchange corridor and the existing development	Quality	Storage Capacity =	910	0.42			462,571	54,600	517,171	100	517,171	-	-	-	517,171	
ANC	11+	C	8	Garner Neighbourhood Master Drainage Plan. Ancaster	July. 1996 Rev. Nov. 2003	17.06	MDP addressing drainage related issues for existing and future development	Proposed Quality Facility #2: Extended detention wet pond	Immediately east of the MTO lands on the south side of the creek tributary	Quality	Storage Capacity =	3,080	0.68		1.26	1,402,169	184,800	1,586,969	100	1,586,969	-	-	-	1,586,969	
ANC	0-5	C	9	Garner Neighbourhood Master Drainage Plan. Ancaster	July. 1996 Rev. Nov. 2003	34.37	MDP addressing drainage related issues for existing and future development	Proposed Quantity Facility #3: Extended detention wet pond	Across the creek tributary from Facility #2 on the north side	Quality	Storage Capacity =	13,120	1.37		1.12	1,242,048	787,200	2,029,248	100	2,029,248	-	-	-	2,029,248	
ANC	0-5	C	13	Meadowlands Phase IV - Dussin Pond		21.04			Dussin Pond	Quality / Quantity	Storage Capacity =	3,800			0.85	945,158	228,000	1,173,158	100	1,173,158	-	-	-	1,173,158	
ANC	11+	C	14	Meadowlands Phase IV		6			Springbrook at Garner	Quality / Quantity	Storage Capacity =	1,140		0.36		400,302	68,400	468,702	100	468,702	-	-	-	468,702	
ANC	0-5	C	16	D'Amico Cimico Properties Stormwater Management Report	Oct. 2008	34.49	SWM Plan for proposed urban development	SWMF	Garner Road East and Glancaster Road	Quality / Quantity	Storage Volume =	9,400		2.07	1.15	1,278,743	564,000	1,842,743	100	1,842,743	-	-	-	1,842,743	Updated report, different drainage areas
ANC	0-5	C	17	D'Amico Cimico Properties Stormwater Management Report	Oct. 2008	17.84	SWM Plan for proposed urban development	SWMF	Garner Road East and Glancaster Road	Quality / Quantity	Storage Volume =	11,500		1.07	0.82	911,799	690,000	1,601,799	100	1,601,799	-	-	22,447	1,579,352	Updated report, different drainage areas
ANC	11+	C	20	Limestone Manor Functional Servicing Report	Dec. 2005	7.86	SWM Plan for proposed urban development	SWMF	Wilson Street West and Shaver Road	Quality / Quantity	Storage Volume =	730		0.47		524,396	43,800	568,196	100	568,196	-	-	-	568,196	
ANC	11+	C	22	Woodland Manor Preliminary SWM Report	Jul-08	15.3	SWM Plan for proposed urban development	SWMF	Sulpher Springs Road and Mansfield Drive	Quality / Quantity	Storage Volume =	10,816		0.92		1,020,770	648,960	1,669,730	100	1,669,730	-	-	-	1,669,730	
ANC	11+	C	24	Miller's pond expansion		5		SWMF	Shaver Road and Gamer Road	Quality		950	0.20			222,390	57,000	279,390	100	279,390	-	-	-	279,390	See map for assumed location
ANC	11+	C	25	Golf Stream Manor		36				Quality / Quantity		25,920	1.44			1,601,208	1,555,200	3,156,408	100	3,156,408	-	-	-	3,156,408	See map for assumed location
ANC	11+	C	28	Limekiln Area		8		SWMF		Quality	Storage Volume =	-	0.32			355,824	50,000	405,824	100	405,824	-	-	-	405,824	OGS
ANC	11+	C	29	Sprinbrook Drive		10		SWMF		Quality	Storage Volume =	-				-	50,000	50,000	100	50,000	-	-	-	50,000	OGS
ANC	11+	R	3	N/A	N/A	31.34	Flood Control	Future Retrofit	Galley Crt & Speers Rd	Quality						-	420,000	420,000	30	126,000	294,000	-	-	126,000	
ANC	11+	R	22	N/A	N/A	2.19	Flood Control	Future Retrofit	Harrington Place and Lover's Lane	Quality						-	400,000	400,000	50	200,000	200,000	-	-	200,000	
ANC	11+	R	60	Tiffany, City of Hamilton, Starward Homes Limted	Jun-93	25.07		Future Retrofit	Scenic Dr & Sanatotium Dr	Quality						-	400,000	400,000	60	240,000	160,000	-	-	240,000	
ANC	11+	R	70	Drainage Report - The Meadowlands	N/A	296.9		Future Retrofit	Hwy 403 and Golf Links Rd	Quality						-	3,920,000	3,920,000	40	1,568,000	2,352,000	-	-	1,568,000	
ANC	11+	R	71	Drainage Report - The Meadowlands	N/A	42.51		Future Retrofit	Golf Links Rd and Meadowlands Blvd	Quality						-	570,000	570,000	40	228,000	342,000	-	-	228,000	
ANC	11+	R	72	Drainage Report - The Meadowlands	N/A	18.03		Future Retrofit	Golf Links Rd. and Meadowlands Blvd.	Quality						-	400,000	400,000	40	160,000	240,000	-	-	160,000	
BMH	11+	C	7	Master Drainage Plan Update Report : Binbrook Settlement Area	Oct. 2006	64.7	Identify SWM measures for existing and future redevelopment	SWMF#6 to treat flows from Node D	Area draining to the south west limits of Binbrook Urban Settlemnt Area	Quality / Quantity	Storage Capacity =	22,240	2.59			2,302,181	1,334,400	3,636,581	100	3,636,581	-	-	-	3,636,581	Moved west to creek, potential second facility across watercourse
BMH	11+	C	10	Mountaingate Functional Servicing Report	Oct. 2007	100.66	SWM Plan for proposed urban development	SWMF	South west of new Hwy - 6	Quality / Quantity	Storage Volume =	26,981		6.04	5.15	4,581,234	1,618,860	6,200,094	100	6,200,094	-	-	-	6,200,094	New drainage area
BMH	11+	C	21	Master Drainage Plan Update Report : Binbrook Settlement Area	Oct. 2006	68.4	Identify SWM measures for existing and future redevelopment	SWMF		Quality / Quantity	Storage Capacity =	26,258	2.74			2,433,836	1,575,480	4,009,316	100	4,009,316	-	-	-	4,009,316	Opposite side of watercourse from B-7
BMH	11+	C	20	Binbrook Settlement Area	N/A	30	additional facility adjacent to SW watercourse	SWMF	Area draining to the south west near Fletcher Road	Quality / Quantity	Storage Capacity =	21,600		1.80		1,601,208	1,296,000	2,897,208	100	2,897,208	-	-	-	2,897,208	See map for assumed location SW near Fletcher Road
BMH	11+	R	54	N/A	N/A	16.01	Flood Control	Future Retrofit	Marion St and Spitfire Dr	Quality						-	400,000	400,000	20	80,000	320,000	-	-	80,000	
BMH	11+	R	75	Southbrook on the Green	Jun-00	52.36		Future Retrofit	Regional Rd 56 and Binbrook Rd	Quality						-	700,000	700,000	40	280,000	420,000	-	8,021	271,979	
HAM	0-5	C	6	Mountain Brow Boulevard Crossing and Central Mountain Stormwater management Class EA	Sept. 2003	317	Provide quality treatment to stormwater before discharging to Red Hill Creek	Proposed wetland	Within Mount Albion Conservation area between Stonechurch and Dartnell Road Interchange - wetland	Quality	Storage volume =	11,500			-	-	762,500	762,500	100	762,500	-	-	-	762,500	Cost as reported
HAM	11+	C	9	Mewburn andx Sheldon Neighbourhoods Master Servicing Plan	2011	48	SWM Plan for proposed urban development	SWMF	Wm Connell West 5th	Quantity	Storage Capacity =	10,000	1.92			1,707,955	600,000	2,307,955	100	2,307,955	-	-	-	2,307,955	Same location
HAM	11+	C	12	Hannon Creek SWS – North Glanbrook Industrial Business Park MDP	Nov. 2008	54.8	Develop a Master Drainage Plan for the Hannon Creek Subwatershed	SWMF	in tandem with HAM29	Quality / Quantity	Storage volume =	4,000		3.29		2,924,873	240,000	3,164,873	100	3,164,873	-	-	-	3,164,873	New location
HAM	0-5	C	24	Mewburn andx Sheldon Neighbourhoods Master Servicing Plan	Dec. 2004	15.9	SWM Plan for proposed urban development	SWMF	Upper James Road and Stone Creek Road	Quantity	Storage Capacity =	5,800	0.64			565,760	348,000	913,760	100	913,760	-	-	-	913,760	New pond to help H-9
HAM	11+	C	26	Upper Sherman/Acadia		3	Stormwater quality and associated resource management	SWMF	Upper Shernman and Acadia	Quantity	Storage Volme =	600	0.12			106,747	36,000	142,747	100	142,747	-	-	-	142,747	Per Development engineering comments
HAM	11+	C	27	Brow Lands Former Chedoke Hospital		5	Provide quality treatment to stormwater before discharging at escarpment	Proposed wetland	potentially located between Scenic and Sanatorium	Quality	Storage volume =	950	0.20			177,912	57,000	234,912	100	234,912	-	-	-	234,912	
HAM	11+	C	28	Eden Park/Parkview	2011	33.29	SWM Plan for proposed urban development	SWMF	NE limit of development	Quality	Storage volume =	8,850	1.33			1,184,538	531,000	1,715,538	100	1,715,538	-	-	-	1,715,538	
HAM	11+	C	29	Miles	2011	10	SWM Plan for proposed urban development	SWMF	NE limit of development	Quality	Storage volume =	1,900	0.40			355,824	114,000	469,824	100	469,824	-	-	-	469,824	
HAM	11+	C	30	Montgomery Creek Nash Orchards		6						1,064	0.24			213,494	63,840	277,334	100	277,334	-	-	-	277,334	formerly SCM6
HAM	11+	R	55	Villages of Glancaster	Jul. 1990	77.63	Flood Control	Future Retrofit	Twenty Rd and Garth St	Quality			3.11			2,762,262	1,030,000	3,792,262	80	3,033,809	758,452	-	-	3,033,809	
SCL	11+	C	2	SCUBE West Subwatershed Study (Draft)	Oct. 2010	26.4	Stormwater management strategy	SWMF	WC6 south of Barton SCUBE West	Quantity / Quality	wet pond #3	22,038		1.58		1,409,063	1,322,280	2,731,343	100	2,731,343	-	-	-	2,731,343	See map for assumed location
SCL	11+	C	3	SCUBE West Subwatershed Study (Draft)	Oct. 2010	26.5	Stormwater management strategy	SWMF	WC6.1 south of Barton SCUBE West	Quantity / Quality	wet pond #4	16,006		1.59		1,414,400	960,360	2,374,760	100	2,374,760	-	-	-	2,374,760	See map for assumed location
SCL	11+	C	4	SCUBE West Subwatershed Study (Draft)	Oct. 2010	21.1	Stormwater management strategy	SWMF	WC7 south of Barton SCUBE West	Quantity / Quality	wet pond #5	17,088		1.27		1,126,183	1,025,280	2,151,463	100	2,151,463	-	-	-	2,151,463	See map for assumed location
SCL	11+	C	12	SCUBE East Subwatershed Study (Draft)	Nov. 2010	54	Stormwater management strategy	SWMF	SCUBE Central	Quantity / Quality	wet pond #9-2	33,191		3.24		2,882,174	1,991,460	4,873,634	100	4,873,634	-	-	-	4,873,634	See map for assumed location
SCL	11+	C	13	SCUBE East Subwatershed Study (Draft)	Nov. 2010	23.1	Stormwater management strategy	SWMF	SCUBE Central	Quantity / Quality	wet pond #9-3	14,218		1.39		1,232,930	853,080	2,086,010	100	2,086,010	-	-	-	2,086,010	See map for assumed location

ANC: Ancaster
BMH: Binbrook / Mount Hope
HAM: Hamilton Mountain
SCL: Stoney Creek - Lower
SCM: Stoney Creek - Mountain
WAT: Waterdown

APPENDIX F-2: CATEGORY C - STORMWATER MANAGEMENT (QUALITY AND OR QUANTITY) FACILITIES RESIDENTIAL

Category			SWMF #	Project Title	Year	Drainage Area (ha)	Purpose	SWMF/ Drainage Work										Growth Related %	Net GrowthTotal Assiciated Cost ($)	Existing Benefit	Direct Developer Contribution ($)	Non-Res Area Fraction Cost ($)	Net Total Associated Cost ($)	Remarks
Primary Dev. Areas	Build Out (yr)	Secondary						Type of Work	Location of Work	Type	Description	Volume (m3)	Estimated Footprint 4% (ha)	Estimated Footprint 6% (ha)	Study/Draft Plan Footprint (ha)	Land Cost	Estimated Capital Cost ($)	Estimated Total Cost Including Land						
SCL	11+	C	24	SCUBE East Subwatershed Study (Draft)	Nov. 2010	14.7	Stormwater management strategy	SWMF	SCUBE East	Quality	wet pond #9-1	1,544		0.88		784,592	92,640	877,232	100	877,232	-	-	-	877,232	See map for assumed location
SCL	11+	C	29	SCUBE West Subwatershed Study (Draft)	Oct. 2010	39.8	Stormwater management strategy	SWMF	WC5 south of Barton SCUBE West	Quantity / Quality	wet pond #1	28,266		2.39		2,124,269	1,695,960	3,820,229	100	3,820,229	-	-	-	3,820,229	See map for assumed location
SCL	11+	C	30	SCUBE West Subwatershed Study (Draft)	Oct. 2010	24.5	Stormwater management strategy	SWMF	WC5.2 south of Barton SCUBE West	Quantity / Quality	wet pond #2	23,666		1.47		1,307,653	1,419,960	2,727,613	100	2,727,613	-	-	-	2,727,613	See map for assumed location
SCL	11+	R	16	Lake Vista			Stormwater quality and associated resource management	Storm outfall retrofit	Lake Vista	Quality	OGS					-	50,000	50,000	100	50,000	-	-	-	50,000	possible retrofit
SCL	11+	R	18	Stormwater Quality Management Strategy Stoney Creek Master Plan	2004	27.2	Stormwater quality and associated resource management	Storm outfall retrofit	BFC, Little League Park, Queenston Rd.	Quality	Wetland	2,413				-	144,780	144,780	100	144,780	-	-	-	144,780	
SCL	11+	R	19	Stormwater Quality Management Strategy Stoney Creek Master Plan	2004	33	Stormwater quality and associated resource management	Storm outfall retrofit	BFC, Lake Ave. Park, Huckleberry Dr.	Quality	Wetland	2,582				-	154,920	154,920	100	154,920	-	-	-	154,920	
SCL	11+	R	20	Stormwater Quality Management Strategy Stoney Creek Master Plan	2004	77	Stormwater quality and associated resource management	Storm outfall retrofit	North of Barton St.	Quality	Wetland	6,724				-	403,440	403,440	100	403,440	-	-	-	403,440	
SCL	11+	R	21	Stormwater Quality Management Strategy Stoney Creek Master Plan	2004	20.5	Stormwater quality and associated resource management	Storm outfall retrofit	Lake Avenue, Warrington St.	Quality	Wetland	1,923				-	115,380	115,380	100	115,380	-	-	-	115,380	
SCL	11+	R	68	Stormwater Quality Management Strategy Stoney Creek Master Plan	2004	11	Stormwater quality and associated resource management	Retrofit Existing facility	South of Hwy. 8 and east of Fruitland		wetland	753				-	1,430,000	1,430,000	20	286,000	1,144,000	-	-	286,000	
SCM	11+	C	1	Davis Ck SWS - Nash Nhd	2005	52.48	Preliminary grading plans and SWMF type, locations and preliminary configuratior	Wet pond #B	North limit of First Road W. at west side	Quantity / Quality	Extended Detention Pond	15,219		3.15		2,801,047	913,140	3,714,187	100	3,714,187	-	-	-	3,714,187	
SCM	11+	C	2	Davis Ck SWS - Nash Nhd	2005	21.41	Preliminary grading plans and SWMF type, locations and preliminary configuratior	Wet pond #C	Northwest portion, east of historical lands	Quantity / Quality	Extended Detention Pond	8,754		1.28		1,142,729	525,240	1,667,969	100	1,667,969	-	-	-	1,667,969	
SCM	11+	C	3	Nash Neighbourhood SWM Update Stoney Creek	June. 1999	97	Preliminary grading plans and SWMF type, locations and preliminary configuration	Wet pond #D		Quantity	Include ED in W Quarry wetland (proposed for golf course)	3,500				-	210,000	210,000	0	-	210,000	-	-	-	Private development subject to future planning
SCM	0-5	C	4	Penny Lane		74	Impact of proposed redevelopment on quantity and quality of stormwate	Proposed quality wet pond	Penny Lane	Quality	Detention Vol	26,000	2.96		2.49	2,215,004	1,560,000	3,775,004	100	3,775,004	-	-	-	3,775,004	Cost estimates adjusted from 1998 to 2004
SCM	0-5	C	5	Nash Neighbourhood Functional Servicing Report	Apr. 2008	31.9	Stormwater quality and associated resource management	Planned/ Greenfield	Mud St. West and Upper Centennial Parkway	Quantity / Quality	Quality	5,487		1.91		1,702,618	329,220	2,031,838	100	2,031,838	-	-	127,388	1,904,450	Updated report, different drainage areas
SCM	11+	C	9	Rymal Road Planning Area Master Servicing and Drainage Plan - ROPA 9	Mar. 2002	24.4	MDP addressing drainage related issues for future development	Proposed wetland/wetpond #2B	South side of Rymal Road	Quantity / Quality		2,747		1.46		1,302,316	164,820	1,467,136	100	1,467,136	-	-	-	1,467,136	
SCM	11+	C	10	Rymal Road Planning Area Master Servicing and Drainage Plan - ROPA 9	Mar. 2002	120	MDP addressing drainage related issues for future development	Proposed wetland/wetpond #3	West side of Swayze Road	Quantity / Quality		14,012			1.05	934,038	840,720	1,774,758	100	1,774,758	-	-	-	1,774,758	
SCM	0-5	C	13	"390 Highland Road West" Property		10		SWMF		Quantity / Quality		-				-	50,000	50,000	100	50,000	-	-	-	50,000	OGS
SCM	0-5	C	14	ORC Mud St West		22		SWMF		Quantity / Quality		4,200		1.32		1,174,219	252,000	1,426,219	100	1,426,219	-	-	-	1,426,219	
SCM	0-5	C	17	Fieldgate Estates - Felker Community Functional SWM Assessment	Nov. 2008	40.75	Functional Service Plan for proposed urban development		SW corner Mud St. and Upper Centennial PKWY.		Storage volume =	18,000		2.45	1.87	1,663,477	1,080,000	2,743,477	100	2,743,477	-	-	685,869	2,057,608	
SCM	0-5	C	18	Future Planned Residential Development		6	easterly portion			Quality / Quantity		4,320		0.36		320,242	259,200	579,442	100	579,442	-	-	-	579,442	See map for assumed location
SCM	0-5	C	19	Future Planned Residential Development		14	westerly portion			Quality / Quantity		10,080		0.84		747,230	604,800	1,352,030	100	1,352,030	-	-	-	1,352,030	See map for assumed location
SCM	11+	R	65	N/A	N/A	15.2		Future Retrofit	Hwy 20 and Highland Rd	Quality						-	400,000	400,000	30	120,000	280,000	-	-	120,000	
SCM	11+	R	67	Deerfield Estate Phase 1	Apr. 1991	19.8		Future Retrofit	Rymal Rd E and Whitedeer Rd.	Quality						-	400,000	400,000	50	200,000	200,000	-	-	200,000	
SCM	11+	R	69	Heritage Green Valley Park Stage II	Sept. 1990	83.9		Future Retrofit	Winter Drive and Paramount Drive	Quality						-	1,100,000	1,100,000	50	550,000	550,000	-	-	550,000	
WAT	11+	C	1'	South Waterdown Subwatershed Study	Apr. 2007	6.2	To guide future development and management of the South Waterdown lands	SWMF	oil grit separator	Quantity / Quality						-	50,000	50,000	100	50,000	-	-	-	50,000	OGS
WAT	11+	C	3	South Waterdown Subwatershed Study	Apr. 2007	9.8	To guide future development and management of the South Waterdown lands	SWMF	Grindstone Creek - East Tributary (north west) 5D	Quantity / Quality	Storage Capacity =	8,600		0.59	1.00	1,111,950	516,000	1,627,950	100	1,627,950	-	-	-	1,627,950	
WAT	0-5	C	4	South Waterdown Subwatershed Study	Apr. 2007	45	To guide future development and management of the South Waterdown lands	SWMF	Grindstone Creek - South west Tributary 2	Quantity / Quality	Storage Capacity =	46,650		2.70	2.60	2,891,070	2,799,000	5,690,070	100	5,690,070	-	-	-	5,690,070	
WAT	11+	C	5	South Waterdown Subwatershed Study	Apr. 2007	21.2	To guide future development and management of the South Waterdown lands	SWMF	East side of Waterdown Bay property	Quantity / Quality	Storage Capacity =	26,000		1.27	1.70	1,890,315	1,560,000	3,450,315	100	3,450,315	-	-	-	3,450,315	
WAT	11+	C	6	South Waterdown Subwatershed Study	Apr. 2007	17.73	To guide future development and management of the South Waterdown lands	SWMF	Salem Property	Quantity / Quality	Storage Capacity =	15,839		1.06		1,182,892	950,340	2,133,232	100	2,133,232	-	-	-	2,133,232	
WAT	0-5	C	10	Waterdown North Master Drainage Plan	Feb. 2007	11.91	Stormwater quality and associated resource management	SWMF for quality and erosion control	West of Borer's Creek, North of Parkside Drive	Quantity / Quality	Storage Capacity =	5,007		0.71	0.87	967,397	300,420	1,267,817	100	1,267,817	-	-	-	1,267,817	Updated report, based on drainage plan
WAT	11+	C	17	Waterdown North Master Drainage Plan	Feb. 2007	16.54	Stormwater quality and associated resource management	SWMF for quality and erosion control	West of Borer's Creek confluence, North of Parkside Drive	Quantity / Quality	Storage Capacity =	8,172		0.99		1,103,499	490,320	1,593,819	100	1,593,819	-	-	-	1,593,819	
WAT	11+	C	18	Waterdown North Master Drainage Plan	Feb. 2007	10.4	Assess proposed expansion for the urban settlement area of Waterdown	SWMF for quality and erosion control	East of Borer's Creek confluence, North of Parkside Drive	Quantity / Quality	Storage Capacity =	3,250		0.62	1.01	1,127,517	195,000	1,322,517	100	1,322,517	-	-	-	1,322,517	
WAT	11+	C	19	Waterdown North Master Drainage Plan	Feb. 2007	9.7	Assess proposed expansion for the urban settlement area of Waterdown	SWMF for quality and erosion control	Along Borer's Creek, NW of Centre Road and Parkside Road intersection	Quantity / Quality	Storage Capacity =	4,350		0.58		647,155	261,000	908,155	100	908,155	-	-	-	908,155	
WAT	0-5	C	21	Waterdown North Master Drainage Plan	Feb. 2007	5	Assess proposed expansion for the urban settlement area of Waterdown	SWMF for quality	Parkside Drive OGS	Quality	Storage Capacity =					-	50,000	50,000	100	50,000	-	-	-	50,000	OGS
WAT	0-5	C	20	Silverwood Homes Inc. Functional Servicing and SWM Report	Jul-08	11.16	Stormwater quality and associated resource management	SWMF	Along Parkside Drive, west of Borer's Creek	Quality / Quantity	Storage Capacity =	7,500		0.67	0.92	1,018,546	450,000	1,468,546	100	1,468,546	-	-	-	1,468,546	New design from Feb. '07 report
U	11+	C	U1	Unidentified			provisional item for unidentified SWM works		open	Quantity / Quality						-	5,000,000	5,000,000	100	5,000,000	-	-	-	5,000,000	per development engineering
U	11+	C	U2		Infills		to include provision for LID infrastructure cost recovery		open	Quality						-	5,000,000	5,000,000	100	5,000,000	-	-	-	5,000,000	per development engineering
U	11+	C	U3	Frontage Costs			estimate of road frontacge costs for 52 residential SWM facilities		open	Quantity / Quality	40m * $1500/m per facility					-	3,120,000	3,120,000	100	3,120,000	-	-	-	3,120,000	per development engineering
Total Residential																**70,844,069**	**63,459,800**	**134,303,869**	**94.44**	**126,833,417**	**7,470,452**	**0**	**843,725**	**125,989,691**	

APPENDIX F-2: CATEGORY C - STORMWATER MANAGEMENT (QUALITY AND OR QUANTITY FACILITIES) NON-RESIDENTIAL

Category			SWMF #	Project Title	Year	Drainage Area (ha)	Purpose	SWMF/ Drainage Work				Volume (m3)	Estimated Footprint 4% (ha)	Estimated Footprint 6% (ha)	Study/Draft Plan Footprint (ha)	Land Cost ($)	Estimated Capital Cost ($)	Estimated Total Cost Including Land	Growth Related %	Net GrowthTotal Assiciated Cost ($)	Existing Benefit	Direct Developer Contribution ($)	Residential Area Fraction Cost ($)	Net Total Associated Cost ($)	Remarks
Primary Dev. Areas	Build Out (yr)	Secondary						Type of Work	Location of Work	Type	Description														
ANC	11+	C	1	Stormwater Management Report - Update Ancaster Industrial Park	Dec. 2002	74.47	SWM Plan for proposed urban development	Extended detention pond for quantity and quality treatment of Drainage Area 1	Close to the outlet of Drainage Area 1	Quantity / Quality	Storage Capacity =	21,700		4.47		4,968,415	1,302,000	6,270,415	0	-	-	6,270,415	-	-	City estimate of revised drainage area
ANC	11+	C	11	Ancaster Industrial Park, Stormwater Detention Facilities Area No. 1,3 and 4	July. 1990	8.2			Detention Pond #A	Quantity		1,558	0.33			364,720	93,480	458,200	0	-	-	458,200	-	-	
ANC	0-5	C	12	Duff's Corner Corporate Business Park SWM Report	Apr. 2007	45.99	SWM Plan for proposed urban development	Wilson Street West and Garner Road West (Duff's Corner)	Detention Pond #B	Quantity	Storage Volume =	23,350	1.84		1.10	1,223,145	1,401,000	2,624,145	0	-	-	2,624,145	-	-	Updated report, different drainage area
ANC	11+	C	23	Trustwood Industrial Park east facility	Dec-07	30	Functional Servicing Report industrial	SWMF	west of Shaver	Quality / Quantity	final drainage area to be determined	29,760		1.80		2,001,510	1,785,600	3,787,110	0	-	-	3,787,110	-	-	drainage area to change, meeting with City and A.J. Clarke May 14 2008
ANC	11+	C	27	Trustwood Industrial Park west facility		19	Functional Servicing Report industrial	SWMF	west of Shaver	Quality / Quantity	final drainage area to be determined	3,728		1.14		1,267,623	223,643	1,491,266	0	-	-	1,491,266	-	-	assumed cost, meeting with City and A.J. Clarke May 14 2009
BMH	11+	C	9	Future Planned Non-Residential Development		25		SWMF		Quality / Quantity	Storage Capacity =	4,750		1.50		1,334,340	285,000	1,619,340	0	-	-	1,619,340	-	-	See map for assumed location
BMH	11+	C	11	Future Planned Non-Residential Development		36		SWMF		Quality / Quantity	Storage Capacity =	6,840		2.16		1,921,450	410,400	2,331,850	0	-	-	2,331,850	-	-	See map for assumed location
BMH	11+	C	12	Future Planned Non-Residential Development		20		SWMF		Quality / Quantity	Storage Capacity =	3,800		1.20		1,067,472	228,000	1,295,472	0	-	-	1,295,472	-	-	See map for assumed location
BMH	11+	C	13	Future Planned Non-Residential Development		26		SWMF		Quality / Quantity	Storage Capacity =	4,940		1.56		1,387,714	296,400	1,684,114	0	-	-	1,684,114	-	-	See map for assumed location
BMH	0-5	C	14	Orlick Aeropark Design Brief	Jan. 2009	36.94	SWM Plan for proposed urban development	dry pond	Upper James St. and Dickenson Road	Quantity	Storage volume =	14,100	1.48		1.23	1,094,159	846,000	1,940,159	0	-	-	1,940,159	-	-	Updated report, defined location
BMH	11+	C	15	Future Planned Non-Residential Development		40		dry pond		Quantity	Storage Capacity =	7,600	1.60			1,423,296	456,000	1,879,296	0	-	-	1,879,296	-	-	See map for assumed location
BMH	11+	C	16	Future Planned Non-Residential Development		15		dry pond		Quantity	Storage Capacity =	2,850	0.60			533,736	171,000	704,736	0	-	-	704,736	-	-	See map for assumed location
BMH	11+	R	53	Greater Hamilton Airport Business Park	Oct. 1991	11.65	Quality control facility		Hwy 6 & Dickenson Rd W	Quality						-	400,000	400,000	0	-	-	400,000	-	-	
HAM	11+	C	7	Mountain Brow Boulevard Crossing and Central Mountain Stormwater management Class EA, City of Hamilton	Sept. 2003	221	Provide quality treatment to stormwater before discharging to Red Hill Creek	Proposed wetland	Mount Albion Conservation Area at West Hannon Creek Tributary - wetland	Quality	Storage volume =	10,700			-	-	508,750	508,750	0	-	407,000	101,750	-	-	Cost as reported - 20% growth related
HAM	11+	C	10	Hannon Creek SWS – North Glanbrook Industrial Business Park MDP	Mar-09	335.19	Develop a Master Drainage Plan for the Hannon Creek Subwatershed	SWMF	HC15	Quality / Quantity	Flood Control Volume =	83,298			5.46	4,852,864	4,997,858	9,850,723	0	-	-	9,850,723	146,942	(146,942)	New location
HAM	11+	C	11	Hannon Creek SWS – North Glanbrook Industrial Business Park MDP	Mar-09	108.7	Develop a Master Drainage Plan for the Hannon Creek Subwatershed	SWMF	HC3	Quality / Quantity	Flood Control Volume =	41,719		6.52	4.10	3,647,196	2,503,140	6,150,336	0	-	-	6,150,336	433,669	(433,669)	New location
HAM	11+	C	13	Hannon Creek SWS – North Glanbrook Industrial Business Park MDP	Mar-09	36	Develop a Master Drainage Plan for the Hannon Creek Subwatershed	SWMF	TM3	Quality / Quantity	Flood Control Volume =	13,537		2.16	1.85	1,645,686	812,220	2,457,906	0	-	-	2,457,906	-	-	New location
HAM	11+	C	14	Hannon Creek SWS – North Glanbrook Industrial Business Park MDP	Mar-09	46.3	Develop a Master Drainage Plan for the Hannon Creek Subwatershed	SWMF	HC6	Quality / Quantity	Flood Control Volume =	16,404		2.78	2.09	1,859,180	984,240	2,843,420	0	-	-	2,843,420	-	-	See map for assumed location
HAM	11+	C	15	Hannon Creek SWS – North Glanbrook Industrial Business Park MDP	Mar-09	71.3	Develop a Master Drainage Plan for the Hannon Creek Subwatershed	SWMF	HC7	Quality / Quantity	Flood Control Volume =	28,904		4.28	3.11	2,766,532	1,734,240	4,500,772	0	-	-	4,500,772	-	-	See map for assumed location
HAM	11+	C	16	Hannon Creek SWS – North Glanbrook Industrial Business Park MDP	Mar-09	21.6	Develop a Master Drainage Plan for the Hannon Creek Subwatershed	SWMF	HC8	Quality / Quantity	Flood Control Volume =	15,155		1.30	2.00	1,779,120	909,300	2,688,420	0	-	-	2,688,420	-	-	See map for assumed location
HAM	11+	C	17	Hannon Creek SWS – North Glanbrook Industrial Business Park MDP	Mar-09	14.1	Develop a Master Drainage Plan for the Hannon Creek Subwatershed	SWMF	HC9	Quality / Quantity	Flood Control Volume =	10,224		0.85	1.54	1,369,922	613,440	1,983,362	0	-	-	1,983,362	-	-	See map for assumed location
HAM	11+	C	18	Hannon Creek SWS – North Glanbrook Industrial Business Park MDP	Mar-09	19.2	Develop a Master Drainage Plan for the Hannon Creek Subwatershed	SWMF	HC12	Quality / Quantity	Flood Control Volume =	9,671		1.15	1.60	1,423,296	580,260	2,003,556	0	-	-	2,003,556	-	-	See map for assumed location
HAM	11+	C	20	Hannon Creek SWS – North Glanbrook Industrial Business Park MDP	Mar-09	40.7	Develop a Master Drainage Plan for the Hannon Creek Subwatershed	SWMF	HC14	Quality / Quantity	Flood Control Volume =	24,159		2.44	2.72	2,419,603	1,449,540	3,869,143	0	-	-	3,869,143	-	-	See map for assumed location
HAM	11+	C	21	Hannon Creek SWS – North Glanbrook Industrial Business Park MDP	Mar-09	16.6	Develop a Master Drainage Plan for the Hannon Creek Subwatershed	SWMF	TM1a	Quality / Quantity	Flood Control Volume =	4,902		1.00	0.75	667,170	294,120	961,290	0	-	-	961,290	-	-	See map for assumed location
HAM	11+	C	22	Hannon Creek SWS – North Glanbrook Industrial Business Park MDP	Mar-09	16.6	Develop a Master Drainage Plan for the Hannon Creek Subwatershed	SWMF	TM1b	Quality / Quantity	Flood Control Volume =	4,902		1.00	0.75	667,170	294,120	961,290	0	-	-	961,290	-	-	See map for assumed location
HAM	11+	C	23	Hannon Creek SWS – North Glanbrook Industrial Business Park MDP	Mar-09	35.5	Develop a Master Drainage Plan for the Hannon Creek Subwatershed	SWMF	TM2	Quality / Quantity	Flood Control Volume =	12,769		2.13	1.78	1,583,417	766,140	2,349,557	0	-	-	2,349,557	-	-	See map for assumed location
SCL	6-10	C	9	Creek System Improvement W/C 7	2003	100	Stormwater quality and associated resource management	Previously planned	Arvin Avenue	Quality / Quantity	Wetland	12,325		6.00	2.74	2,437,394	739,500	3,176,894	0	-	-	3,176,894	-	-	Cost reported in SC-WQMS 2004
SCL	11+	C	10	Stormwater Quality Management Strategy. City of Stoney Creek - Master Plan	2004	63	Stormwater quality and associated resource management	Proposed SWMFQuality	Area F/G: S.W of Lewis & S. service Rd.	Quality / Quantity	Wetland	13,067		3.78		3,362,537	509,421	3,871,958	0	-	-	3,871,958	-	-	listed as committed/actual in 2009
SCL	0-5	C	11	SCUBE East Subwatershed Study (Draft)	Nov. 2010	24.8	Stormwater management strategy	SWMF	WC 9 south of CNR west of Lewis - Ridgeview	Quality	wet pond #9-5	3,596		1.49	0.70	6,226,920	215,760	6,442,680	0	-	-	6,442,680	-	-	See map for assumed location
SCL	0-5	C	15	SCUBE East Subwatershed Study (Draft)	Nov. 2010	9.6	Stormwater management strategy	SWMF	Trib 10-2 east of Winona	Quantity / Quality	wet pond #10-2	6,288		0.58		512,387	377,280	889,667	0	-	-	889,667	-	-	See map for assumed location
SCL	11+	C	17	SCUBE East Subwatershed Study (Draft)	Nov. 2010	11.8	Stormwater management strategy	SWMF	Fifty Creek east SCUBE East	Quantity / Quality	wet pond #12-1	7,703		0.71		629,808	462,180	1,091,988	0	-	-	1,091,988	-	-	See map for assumed location
SCL	0-5	C	23	SCUBE East Subwatershed Study (Draft)	Nov. 2010	16	Stormwater management strategy	SWMF	Fifty Creek west SCUBE East	Quantity / Quality	wet pond #12-2	10,480		0.96		853,978	628,800	1,482,778	0	-	-	1,482,778	-	-	See map for assumed location

ANC: Ancaster
BMH: Binbrook / Mount Hope
HAM: Hamilton Mountain
SCL: Stoney Creek - Lower
SCM: Stoney Creek - Mountain
WAT: Waterdown

APPENDIX F-2: CATEGORY C - STORMWATER MANAGEMENT (QUALITY AND OR QUANTITY FACILITIES) NON-RESIDENTIAL

Category			SWMF #	Project Title	Year	Drainage Area (ha)	Purpose	SWMF/ Drainage Work										Growth Related %	Net GrowthTotal Associated Cost ($)	Existing Benefit	Direct Developer Contribution ($)	Residential Area Fraction Cost ($)	Net Total Associated Cost ($)	Remarks
Primary Dev. Areas	Build Out (yr)	Secondary						Type of Work	Location of Work	Type	Description	Volume (m3)	Estimated Footprint 4% (ha)	Estimated Footprint 6% (ha)	Study/Draft Plan Footprint (ha)	Land Cost ($)	Estimated Capital Cost ($)	Estimated Total Cost Including Land						
SCL	11+	C	25	SCUBE East Subwatershed Study (Draft)	Nov. 2010	16.2	Stormwater management strategy	SWMF	WC 9 south of CNR	Quantity / Quality	wet pond #9-4	10,606		0.97		864,652	636,360	1,501,012	0	-	-	1,501,012	-	-	See map for assumed location
SCL	0-5	C	26	SCUBE East Subwatershed Study (Draft)	Nov. 2010	16.4	Stormwater management strategy	SWMF	Trib 10.1 east of Winona Fifty Point Industrial Park	Quantity / Quality	wet pond #10-1	10,742		0.98		875,327	644,520	1,519,847	0	-	-	1,519,847	-	-	See map for assumed location
SCL	11+	C	27	SCUBE East Subwatershed Study (Draft)	Nov. 2010	9.3	Stormwater management strategy	SWMF	Trib 10.3 west of Winona	Quantity / Quality	wet pond #10-3	6,092		0.56		496,374	365,520	861,894	0	-	-	861,894	-	-	See map for assumed location
SCL	11+	C	28	SCUBE East Subwatershed Study (Draft)	Nov. 2010	10.4	Stormwater management strategy	SWMF	WC 7.2 south of CNR	Quantity / Quality	wet pond #7-2-1	6,778		0.62		555,085	406,680	961,765	0	-	-	961,765	-	-	See map for assumed location
SCL	11+	R	82	Glover Industrial Park Phase 2B	Jan. 1989	2.05	Flood Control	Future Retrofit	Arvin Av. / Glover Rd	Quality						-	400,000	400,000	0	-	320,000	80,000	-	-	20 % growth related
WAT	11+	C	1	South Waterdown Subwatershed Study	Apr. 2007	15	To guide future development and management of the South Waterdown lands	SWMF	Grindstone Creek - East Tributary 58 (Northwest)	Quantity / Quality	Storage Capacity =	11,500		0.90	1.20	1,334,340	690,000	2,024,340	0	-	-	2,024,340	-	-	
WAT	11+	C	12	Clappison Industrial Park		60	Quality only	SWMF	to be determined	Quality / Quantity	Storage Capacity =	11,400		3.60		4,003,020	684,000	4,687,020	0	-	-	4,687,020	-	-	Location and size are subject to detail study
WAT	11+	R	35	Tech Park	Feb. 1994	15.66	Quality and Flood Control	Future Retrofit	Hwy 6 & Hwy 5	Quality						-	400,000	400,000	0	-	320,000	80,000	-	-	20 % growth related
U	11+	C	U4	Unidentified			provisional item for unidentified non-res SWM works with residential component		open	Quantity / Quality						-	10,000,000	10,000,000	0	-	-	10,000,000	-	-	per development engineering
																							-	-	
Total Non-Residential																**65,420,558**	**41,505,912**	**106,926,471**	**0.00**	**0**	**1,047,000**	**105,879,471**	**580,612**	**(580,612)**	
Grand Total																**136,264,628**	**104,965,712**	**241,230,340**	**52.58**	**126,833,417**	**8,517,452**	**105,879,471**	**1,424,337**	**125,409,080**	

ANC: Ancaster
BMH: Binbrook / Mount Hope
HAM: Hamilton Mountain
SCL: Stoney Creek - Lower
SCM: Stoney Creek - Mountain
WAT: Waterdown

APPENDIX F-2: CATEGORY D - OVERSIZING OF TRUNK STORM SEWERS - DRAFT APPROVED SUBDIVISIONS

Subdivision and Road-Related Oversizing (where draft plans indicate storm sewers over 1200 mm diameter)

TYPE	Pipe Size	Application Number	Pipe Length	Oversize Pipe Cost	Number NH	Oversize MH Cost	Total Over-Size Cost 0-5 Years	Total Over-Size Cost 5-10 Years	Notes
Storm Sewer	1350 mm Diam.	25T200723 - Mountaingate	400	$131,164.00	7		$131,164.00		West leg of Provident Way and south along Rosebury Way to Block 307
		25T200808 - Penny Lane Estates	216	$70,828.56	4		$70,828.56		Street 'A' Manholes 1 to 5 and 5 to 6
		25T-88031 - Sandrina Gardens	135	$44,267.85	0		$44,267.85		Street "G" From west limit of Plan to Street "B" and Street "B" From Street "G" To Street "C"
		25T-95002 - Miles Estates	283	$92,798.53	9		$92,798.53		Through Block 132 to Upper Sherman Avenue
		Parkside Drive	260				$520,000.00		Development Engineering Estimate
	1500 mm Diam.	25T200208 - Red Hill Summit Est E	130	$94,380.00	2		$94,380.00		This size not yet verified - approximate only.
		25T200808 - Penny Lane Estates	44	$31,944.00	2		$31,944.00		Street 'A' Manholes 6 to 17/18
		25T-88031 - Sandrina Gardens	135	$98,010.00	0		$98,010.00		Street "C" From Street "B" To Court "E"
		25T-95002 - Miles Estates	152	$110,352.00	4		$110,352.00		Street "G" From Miles Road To Street "F" and Street "F" From Street "G" To Block 132
	1650 mm Diam.	25T200605 - Summerlea West	225	$261,087.75	2	$9,694.52		$270,782.27	Street "G" from Street "C" to Street "H"
		25T200908 - Paletta - Felker Nhd	190	$220,474.10	3	$14,541.78	$235,015.88		Highbury drive from Sir Isaac Brock Drive to Approx. 200m Southerly
		25T200908 - Paletta - Felker Nhd	210	$243,681.90	5	$24,236.30	$267,918.20		Sir Isaac Brock Drive from Highbury Drive to Approx. 220 metres westerly
		25T-88031 - Sandrina Gardens	80	$92,831.20	2	$9,694.52	$102,525.72		Street "C" from Terni Blvd. To Court "E"
	1800 mm Diam.	25T200605 - Summerlea West	270	$460,320.30	5	$24,236.30		$484,556.60	Street "G" from Street "H" to proposed storm pond
		Rymal Road	1200					$2,400,000.00	Development Engineering Estimate
		Highland Road	500				$1,000,000.00		Development Engineering Estimate
		Sandrina	250				$500,000.00		Development Engineering Estimate
		Upper Sherman/Acadia	300				$600,000.00		Development Engineering Estimate
		Trinity Road	250				$500,000.00		Development Engineering Estimate
Total by Period			**5230**	**$1,952,140.19**	**45**	**$82,403.42**	**$4,399,204.74**	**$3,155,338.87**	

Grand Total								**$7,554,543.61**	

APPENDIX F-2 - CATEGORY E - CULVERT AND BRIDGES NOT PREVIOUSLY IDENTIFIED

Ref: Hamilton Development Charges -Transportation (EarthTech)

Item Number	Road Project Description	Improvement	Length km.	Number of Culverts/Bridges > 1m^2 end area	New or Widening	Width m	Identified in Category "A"	Small @$75k 1-4m^2	Meduim @$150k 4-8m^2	Large @$300k >8m^2	Cost (2011$)
1	Airport Rd. - U. James to GlancasterRd.	2r-2i	3.2	7	Widening	26		7			$525,000
2	Anchor Road Extension	2i	0.53								$0
3	Annual Intersection Ped.&Traffic sig. Mod.	City wide	N/A								
4	Annual Misc. Land Acquisition	City wide	N/A								
5	Annual New Sidewalk Program	City wide	N/A								
6	Annual new Traffic Signals	City wide	N/A								
7	Annual Road Urbanization	City wide	N/A								
8	Annual Roadside Substandard Drainage	City wide	N/A								
9	Annual Roadabouts										$0
10	Annual Street Lighting	City wide	N/A								
11	Annual Traffic Calming-various locations	City wide	N/A								
12	Arvin Ave- McNeilly to Lewis	2i	0.80								
13	Arvin Ave.-Jones to existing end	2i	0.50	1	New		1				
14	Arvin Avenue -extend to McNeilly	2i	0.38	1	New		1				
15	Barton St.-Fruitland Rd to Glover Rd.	2r-3u	2.61	1	New		1				
16	Barton Street- Glover to Fifty	2r-3u	3.34	1	New		1				
17	Binbrook Rd.-E and W of Hwy. 56	2r-5u	0.50								
18	Binbrook Rd.-Fletchers Rd. to .3 km west of Hwy. 56	2r-2-+bike	1.70								
19	Book Road - Southcote To Fiddlers Green (AEGD)	2r-2i	2.00	4	Widening	26		4			$300,000
20	Butter Road - Glancaster to Fiddlers Green (AEGD)	2r-2i	2.20	5	Widening	26		5			$375,000
21	Carluke Road - Fiddlers Green to Glancaster Road (AEGD)	2r-2i	1.00	1	Widening	26		1			$75,000
22	Centre Rd.- Northlawn to Parkside Dr.	2r-3u	1.20								
23	Community Ave.-Stoney Creek limits to Teal Ave.	2r-2i	0.50								
24	Copes Lane east of Jones Road	2r-2u	0.50								$0
25	Cormorant Road Ext. - Tradewind to Trinity Road (AIP)	2i	0.80	1	Widening	26		1			$75,000
26	Dartnall Rd. - Stone Church Rd. to Rymal Rd.	2r-4/5u	1.00								
27	Dartnall Rd. - Rymal Rd to Dickenson	2i	2.80	2	New	26		2			$150,000
28	Dickenson Rd.E-East of Hwy. 6 to west of Nebo Rd.	2r-3u	4.50	5	Widening	26		4		1	$600,000
29	Dickenson Rd.E-west of Nebo Rd. to west of Glover	2r-2i	1.10								
30	Dickenson Rd.W-west of Highway 6 to Glancaster Rd.	2r-2i	2.90								
31	Dickenson Rd Ext. - Glancaster Rd. to Southcote Rd. (AEGD)	2r-2i	1.20	2	New	26		2			$150,000
32	Fall Fairway - Binbrook										$0
33	Fiddlers Green Road - Garner to Carluke Road (AEGD)	2r-2i	6.00	9	Widening	26		9			$675,000

APPENDIX F-2 - CATEGORY E - CULVERT AND BRIDGES NOT PREVIOUSLY IDENTIFIED

Ref: Hamilton Development Charges -Transportation (EarthTech)

Item Number	Road Project Description	Improvement	Length km.	Number of Culverts/Bridges > 1m^2 end area	New or Widening	Width m	Identified in Category "A"	Small @$75k 1-4m^2	Meduim @$150k 4-8m^2	Large @$300k >8m^2	Cost (2011$)
34	Fifty Rd.-QEW to Hwy. 8	2r-2u	0.80	1	Widening	26		1			$75,000
35	First Rd. West-Green Mountain to Glover Mountain	3u	0.90								
36	First Rd. - Hwy 20 to Green Mtn Road	2r-3u	3.00	2	Widening	26		2			$150,000
37	Fletcher Rd.- Golf Club Rd to Binbrook Rd.	2r-2ru	6.25	2	Widening	26		2			$150,000
38	Fletcher Rd.- Rymal to Golf Club Rd	2r-3u	2.00	1	Widening	26		1			$75,000
39	Fruitland Rd. By-pass- land requirements	N/A	N/A								
40	Fruitland Rd. Escarpment Access	2r	2.10	1	Widening	26		1			$75,000
41	Fruitland Rd.-Arvin Ave. to Barton St.	2u-4u	0.36								
42	Fruitland Road By-pass	4u	1.15	1	New	26		1			$75,000
43	Garden Ave.-Teal to Pinelands	2r-2i	0.20								
44	Garner Rd.- 50 M e of Fiddlers to 50m w of Miller La	2r-5u	0.51								
45	Garner Rd.-50 m e of Shaver to 50m w of Fiddlers	2r-5u	2.36								
46	Garner Rd.-50m w of Southcote to 50M e of Southcote	4r-5u	0.10								
47	Garner Rd.-Hwy. 2 to 50m w of Shaver	2r-5u	0.72								
48	Garth St.- Twenty Rd. to Dickenson Rd.	2i	1.40								
49	Garth St.-Stone Church to Rymal	2r-2u	1.04								
50	Glancaster Rd.- Garner Rd. to Twenty Rd.	2r-2ru	1.20	1	Widening	26				1	$300,000
51	Glover Rd.-Rymal to 650m s. of Twenty Rd.	2r-2i	2.00								
52	Golf Club Road - Trinity Chruch Rd. to Second Rd. East	2r-2u	7.00	4	Widening	26		4			$300,000
53	Golf Links Rd.-McNiven to Hwy. 403	2r-3u	0.40								
54	Governor's Rd. - Creighton to Osler	3u-5u	1.30								
55	Green Mtn. Road - U. Cetennial to Second Road E.	2r-2u		2	Widening	26		2			$150,000
56	Green Mtn. Road- First Rd. W. to Centennial	3u	0.85								
57	Hamilton Drive - Hwy. 403 to .35 km south	2r-2u	0.35								
58	Highland Road - Pritchard Rd. to U. Mt. Albion (EMIBP)	2r-5u	0.74		Widening	26		2			$150,000
59	Highland Road - U. Centennial to Second Road E.	2r-5u	2.00	4	Widening	26		4			$300,000
60	Highland Road - U. Mt. Albion to Winterberry	2r-5u	0.56	2	Widening	26		2			$150,000
61	Highway 20 - 350m S of Mud to 830m S of Mud	4r-5u	0.48								
62	Highway 20 -100m s of Grn Mtn to 800m s of Grn Mtn	4r-5u	0.70								
63	Hwy. 2 Wilson St.-Hwy. 52 to Hwy 53	4r-5u	1.80								
64	Hwy. 5/6 Interchange	n/a		1	New				1		$150,000
65	Hwy. 5/6 Northwest Quadrant Collector Road (FIP)	2i	0.75								$0

APPENDIX F-2 - CATEGORY E - CULVERT AND BRIDGES NOT PREVIOUSLY IDENTIFIED

Ref: Hamilton Development Charges -Transportation (EarthTech)

Item Number	Road Project Description	Improvement	Length km.	Number of Culverts/Bridges > 1m^2 end area	New or Widening	Width m	Identified in Category "A"	Small @$75k 1-4m^2	Meduim @$150k 4-8m^2	Large @$300k >8m^2	Cost (2011$)
66	Hwy. 8 (Stoney Creek) - Dewitt to Fruitland	2r-5u	0.80								
67	Hwy. 8 (Dundas)- Bond St. to Dundas limits	2r-3u	0.40								
68	Hwy. 8 (Dundas)- Hillcrest to Park	2r-3u	0.62								
69	Hwy. 8-Fruitland Rd. to Hamilton Boundary	2r-4r	3.34	4	Widening	26		4			$300,000
70	Isaac Brock- Mud to Green Mtn	3u	1.00								
71	Jerseyville Rd. W.-Wilson to Lloyminn	2r-3u	3.10								
72	Jones Rd.-Barton to South Service Rd	2r-2i	0.90								
73	Kenmore-Arvin to Barton	2r-2i	0.40								
74	Land Acquisition										$0
75	Leaside Ave.-Arvin to Barton	2r-2i	0.30								
76	Lewis Rd.-Barton to South Service Rd.	2r-2i	0.81	1	New		1				
77	McNeilly-Barton to South Service Rd.	2r-2u	1.00								
78	McNiven-Rousseaux to Golf Links	2r-4u	0.62								
79	Mid Block Arterial - Mtn Brow to Dundas	4u	1.05	2	Widening	26		2			$150,000
80	Millen Rd-South Service Rd. to Hwy. 8	2r-3u	2.00								
81	Mohawk - McNiven to Hwy. 403	2r-4u	1.30								
82	Mountain Brow Blvd. (Waterdown)	2r-2u	1.50	3	Widening	26		2			$150,000
83	Mud Street - U. Centennial to 2nd Rd East	2r-2u	2.00	2	Widening	26		2			$150,000
84	N/S Collector - Twenty Rd. to Dickenson Rd. (AEGD)	2i	1.40	?							$0
85	Nebo Rd.-Twenty Rd. to Dickenson Rd.	2r-2i	2.00	4	Widening	26			1	3	$1,050,000
86	Nebo Rd.-Rymal Rd. to Twenty Rd.	2r-3i	0.60								
87	New E/W Road -Tradewind to Trinity Rd.	2i	0.80								
88	New Mid-block Collector-Cormorant to Tradewind	2i	0.30	1	New	26				1	$300,000
89	Noise barriers	N/A	N/A								
90	North Service Rd.-Green to Grays	2r-4i	0.91								
91	North Service Road- Green Rd. to East City Limits	2r-2u	8.30	7	New		7				
92	Oriole - South Service Rd. to Winona	2r-2i	0.50								
93	Parkside Dr.- 900m e. of Hwy 6 to east part of industrial section	2r-3u	2.70								
94	Parkside Dr.-Hwy. 6 to 900m east	2r-5u	0.90	1	New				1		$150,000
95	Pritchard Rd - Stone Church to Rymal (EMIBP)	2r-2i	1.03								$0
96	Pinelands Ave.-Community to South Service Road	2r-2i	0.30								
97	Rail Grade Separations	N/A	N/A								

APPENDIX F-2 - CATEGORY E - CULVERT AND BRIDGES NOT PREVIOUSLY IDENTIFIED

Ref: Hamilton Development Charges -Transportation (EarthTech)

Item Number	Road Project Description	Improvement	Length km.	Number of Culverts/Bridges > 1m^2 end area	New or Widening	Width m	Identified in Category "A"	Small @$75k 1-4m^2	Meduim @$150k 4-8m^2	Large @$300k >8m^2	Cost (2011$)
98	Reg. Rd. 56-Community Core to North Limits	2r-5u	0.60								
99	Reg. Rd. 56- South Limits of ROPA 9 to Binbrook	2r-4r	6.35	6	Widening	26		2	2	2	$1,050,000
100	Rymal Rd. W.-Garth to West 5th	2r-5u	1.22								
101	Rymal Rd.-Ryckmans St. to w. of Dartnall Rd.	3r-5u	5.00								
102	Rymal Rd- w. of Dartnall Rd. to Hwy. 20	2r-5u	5.70								
103	Rymal Road- e. of Glancaster to Garth	2r-5u	1.30								
104	Rymal Road- former west city limits to Upper Paradise	3r-5u	0.20	1	Widening	26				1	$300,000
105	Scenic Dr.-Old City limits to Lavender S. Leg	2r-3u	1.40	1	Widening	26			1		$150,000
106	Seaman St-South Service to Dewitt	2r-2i	0.60								
107	Second Road - Hwy. 20 to Green Mtn. Road	2r-3u	3.00	3	Widening	26		2			$150,000
108	Shaver -Hwy. 403 to Wilson	2r-2u	1.50	1	Widening	26			1		$150,000
109	Shaver - Trustwood to Garner Road (AIP)	2r-2i	1.00	?							$0
110	South Service Rd.-Millen to Grays	2r-4i	1.74	3	Widening	26		1	2		$375,000
111	Southcote Rd. - Garner Rd. to Book Rd. (AEGD)	2r-2i	2.00								$0
112	Southcote-Golf Links Rd. to Garner Rd.	2r-4u	2.20								
113	Springbrook Rd.-Meadowlands Blvd. To Garner Rd.	2r-3u	1.10								
114	Stone Church Rd.-Pritchard to Winterberry	2r-3u	0.75								
115	Stone Church-Wellington to Upper James	2r-3u	0.80								
116	Stoney Creek Ind. Park Infrastructure	N/A	N/A								
117	Sunnyhurst-Barton to North end	2r-2i	0.52								
118	Teal Ave.-Garden Ave. to South Service Rd.	2r-2i	0.30								
119	Trinity Church- Golf Club Rd. to Binbrook Rd.	2r-2ru	5.20	2	Widening	26				2	$600,000
120	Trinity Church - Rymal to Darntall Rd. Ext. (NGIBP)	5u	2.50	3	New	26		3			$225,000
121	Trinity Church-extension from Rymal to Stone Church	5u	1.10								
122	Trinity Church-Rymal to Golf Club Rd.	2r-2i	1.10	2	Widening	26			1	1	$450,000
123	Trinity Rd- 1 km south of Wilson to Hwy. 403	2r-4u	2.20	2	Widening	26				2	$600,000
124	Twenty Rd.-Glancaster to 600m w. f Nebo	2r-3r	1.80								
125	Twenty Rd.-600m w. of Nebo to Trinity Church	2i	7.10								
126	U. Centennial - 100 m of Grn Mtn to 800m of Grn Mtn	4r-5u	0.70								
127	U. Centennial - 350m of Mud to 830 s of Mud	4r-5u	0.48								
128	Upper Gage-Mohawk to Thorley/Edwina	4u-5u	0.58								
129	Upper James-Rymal to City Limits	4r-5u	0.70								

APPENDIX F-2 - CATEGORY E - CULVERT AND BRIDGES NOT PREVIOUSLY IDENTIFIED

Ref: Hamilton Development Charges -Transportation (EarthTech)

Item Number	Road Project Description	Improvement	Length km.	Number of Culverts/Bridges > 1m^2 end area	New or Widening	Width m	Identified in Category "A"	Small @$75k 1-4m^2	Meduim @$150k 4-8m^2	Large @$300k >8m^2	Cost (2011$)
130	Upper Mount Albion Rd.-Rymal Rd. to Mud St.	2r-3u	1.70								
131	Upper Ottawa St.-extend to Twenty Rd.	2i	1.00								
132	Upper Sherman- Stone Church to LINC	2r-3u	0.90								
133	Upper Sherman-Stone Church to Rymal	2r-3u	1.00								
134	Upper Wellington-Limeridge to Stone Church	2r-5u	1.20								
135	Upper Wellington-Rymal to Stone Church	2r-3u	1.00								
136	Waterdown - Burlington Rd. Upgrades	n/a		?							$0
137	Waterdown Bypass (E/W Road)	2u/4u	10.85								$0
138	Waterdown Road - Hamilton Section	2r-3u+bikes	0.29								$0
139	Waterdown - Creek Crossing #1			1	New			1			$75,000
140	Waterdown - Creek Crossing #2			1	New			1			$75,000
141	Waterdown - Creek Crossing #3			1	New			1			$75,000
142	Waterdown Network Improvements-Hamilton Section	4u	N/A	1	Widening	26			1		$150,000
143	Weir's Lane-Hwy. 8 to escarpment	2r-2u	1.50	1	Widening	26			1		$150,000
144	West 5th- Stone Church to Rymal	2r-3u	1.00	1	Widening	26			1		$150,000
145	West 5th-Limeridge to Stone Church	2r-3u	1.20								
146	White Church Rd. - Glancaster to Hwy. 6 (AEGD)	2r-2i	2.30	7	Widening	26		7			$525,000
147	Wilson St.-Hamilton Dr. to just west of Halson	2r-4u	1.60								
148	York Rd.-Hwy. 6 to York Rd. west leg	2r-2ru	3.40								
Grand Total				**124**			**12**	**85**	**13**	**14**	**$12,525,000**
Growth %											**100**
Total Growth											**$12,525,000**

Res	**$8,100,000**
Non-Res	**$4,425,000**

APPENDIX F-2 - GRIDS-RELATED STORMWATER MANAGEMENT (QUALITY AND OR QUANTITY) FACILITIES

Primary Dev. Areas	SWMF #	AEGD Stage #	Drainage Area (ha)	Volume (m3)	Estimated Footprint 4% (ha)	Land Cost 4%	Estimated Capital Cost ($)	Estimated Cost ($)	Growth Related %	Total Growth Assiciated Cost ($)	Post Period Cost ($)	Net Total Assiciated Cost 2011-2031 ($)	Direct Developer Contribution (%)	Direct Developer Contribution ($)	Net Total Assiciated Cost ($)	Remarks
Expansion to Airport SPA	1	2	77	17,325	3.08	2,739,845	1,039,500	3,779,345	100	3,779,345	3,779,345	-	100	-	-	In Ancaster, south of Garner Road
	2	2	33	7,425	1.32	1,174,219	445,500	1,619,719	100	1,619,719	1,619,719	-	100	-	-	In Ancaster, south of Garner Road
	3	2	38.5	8,663	1.54	1,369,922	519,750	1,889,672	100	1,889,672	1,889,672	-	100	-	-	In Ancaster, south of Garner Road
	4	2	88	19,800	3.52	3,131,251	1,188,000	4,319,251	100	4,319,251	4,319,251	-	100	-	-	In Ancaster, south of Garner Road
	5	1	160	36,000	6.40	5,693,184	2,160,000	7,853,184	100	7,853,184	-	7,853,184	100	7,853,184	-	In Ancaster, south of Garner Road
	6	1	63	14,175	2.52	2,241,691	850,500	3,092,191	100	3,092,191	-	3,092,191	100	3,092,191	-	In Ancaster, south of Garner Road
	10	1	33	7,425	1.32	1,174,219	445,500	1,619,719	100	1,619,719	-	1,619,719	100	1,619,719	-	North of Airport
	11	1	28	6,300	1.12	996,307	378,000	1,374,307	100	1,374,307	-	1,374,307	100	1,374,307	-	North of Airport
	12	1	17.88	4,023	0.72	636,213	241,380	877,593	100	877,593	-	877,593	100	877,593	-	North of Airport
	13	1	108	24,300	4.32	3,842,899	1,458,000	5,300,899	100	5,300,899	-	5,300,899	100	5,300,899	-	North of Airport
Potential New Busniess Park (In existing Airport Spa)	14	1	42.5	9,563	1.70	1,512,252	573,750	2,086,002	100	2,086,002	-	2,086,002	100	2,086,002	-	
	15	1	25.5	5,738	1.02	907,351	344,250	1,251,601	100	1,251,601	-	1,251,601	100	1,251,601	-	
	16	1	34	7,650	1.36	1,209,802	459,000	1,668,802	100	1,668,802	-	1,668,802	100	1,668,802	-	
	17	1	41	9,225	1.64	1,458,878	553,500	2,012,378	100	2,012,378	-	2,012,378	100	2,012,378	-	
	18	1	124.88	28,098	5.00	4,443,530	1,685,880	6,129,410	100	6,129,410	-	6,129,410	100	6,129,410	-	
	19	1	100	22,500	4.00	3,558,240	1,350,000	4,908,240	100	4,908,240	-	4,908,240	100	4,908,240	-	Involves off-site stream work
	20	1	230.5	51,863	9.22	8,201,743	3,111,750	11,313,493	100	11,313,493	-	11,313,493	100	11,313,493	-	
	21	1	15	3,375	0.60	533,736	202,500	736,236	100	736,236	-	736,236	100	736,236	-	
	22	1	34	7,650	1.36	1,209,802	459,000	1,668,802	100	1,668,802	-	1,668,802	100	1,668,802	-	
	23	1	140.88	31,698	5.64	5,012,849	1,901,880	6,914,729	100	6,914,729	-	6,914,729	100	6,914,729	-	
	24	1	50.5	11,363	2.02	1,796,911	681,750	2,478,661	100	2,478,661	-	2,478,661	100	2,478,661	-	
	25	1	97	21,825	3.88	3,451,493	1,309,500	4,760,993	100	4,760,993	-	4,760,993	100	4,760,993	-	
	26	2	45	10,125	1.80	1,601,208	607,500	2,208,708	100	2,208,708	2,208,708	-	100	-	-	Involves off-site stream work
	27	2	42.75	9,619	1.71	1,521,148	577,125	2,098,273	100	2,098,273	2,098,273	-	100	-	-	Involves off-site stream work
	28	2	18	4,050	0.72	640,483	243,000	883,483	100	883,483	883,483	-	100	-	-	Involves off-site stream work
	29	2	196.75	44,269	7.87	7,000,837	2,656,125	9,656,962	100	9,656,962	9,656,962	-	100	-	-	
	30	2	24.75	5,569	0.99	880,664	334,125	1,214,789	100	1,214,789	1,214,789	-	100	-	-	
	31	2	16.25	3,656	0.65	578,214	219,375	797,589	100	797,589	797,589	-	100	-	-	
	32	2	15	3,375	0.60	533,736	202,500	736,236	100	736,236	736,236	-	100	-	-	
	33	2	30.25	6,806	1.21	1,076,368	408,375	1,484,743	100	1,484,743	1,484,743	-	100	-	-	
	34	1	24.75	5,569	0.99	880,664	334,125	1,214,789	100	1,214,789	-	1,214,789	100	1,214,789	-	
	35	2	12.75	2,869	0.51	453,676	172,125	625,801	100	625,801	625,801	-	100	-	-	
	36	2	22.5	5,063	0.90	800,604	303,750	1,104,354	100	1,104,354	1,104,354	-	100	-	-	
	37	2	33.75	7,594	1.35	1,200,906	455,625	1,656,531	100	1,656,531	1,656,531	-	100	-	-	Involves off-site stream work
	38	2	56.25	12,656	2.25	2,001,510	759,375	2,760,885	100	2,760,885	2,760,885	-	100	-	-	Involves off-site stream work
	39	1	37.5	8,438	1.50	1,334,340	506,250	1,840,590	100	1,840,590	-	1,840,590	100	1,840,590	-	Involves off-site stream work
Potential Urban Boundary Expansion Area	7	1	20	4,500	0.80	711,648	270,000	981,648	100	981,648	-	981,648	100	981,648	-	South of Twenty Road West, north of Airport
	8	1	37.25	8,381	1.49	1,325,444	502,875	1,828,319	100	1,828,319	-	1,828,319	100	1,828,319	-	South of Twenty Road West, north of Airport
	9	1	58.13	13,079	2.33	2,068,405	784,755	2,853,160	100	2,853,160	-	2,853,160	100	2,853,160	-	South of Twenty Road West, north of Airport
	40	1	11.25	2,531	0.45	400,302	151,875	552,177	100	552,177	-	552,177	100	552,177	-	potential to combine with B10
	41	Elfrida (Res)	126	28,350	5.04	4,483,382	1,701,000	6,184,382	100	6,184,382	-	6,184,382	0	-	6,184,382	First Rd E and Mud
	42	Elfrida (Res)	21.25	4,781	0.85	756,126	286,875	1,043,001	100	1,043,001	-	1,043,001	0	-	1,043,001	Second Rd E, Involves off-site stream work
	43	Elfrida (Res)	60	13,500	2.40	2,134,944	810,000	2,944,944	100	2,944,944	-	2,944,944	0	-	2,944,944	Second Rd E, Involves off-site stream work
	44	Elfrida (Res)	71.25	16,031	2.85	2,535,246	961,875	3,497,121	100	3,497,121	-	3,497,121	0	-	3,497,121	Second Rd E, Involves off-site stream work
	45	Elfrida (Res)	22	4,950	0.88	782,813	297,000	1,079,813	100	1,079,813	-	1,079,813	0	-	1,079,813	NW corner, Trinity Church at Hydro ROW
	46	Elfrida (Res)	147	33,075	5.88	5,230,613	1,984,500	7,215,113	100	7,215,113	-	7,215,113	0	-	7,215,113	HWY 56
	47	Elfrida (Res)	168.75	37,969	6.75	6,004,530	2,278,125	8,282,655	100	8,282,655	-	8,282,655	0	-	8,282,655	HWY 56
	48	Elfrida (Res)	140	31,500	5.60	4,981,536	1,890,000	6,871,536	100	6,871,536	-	6,871,536	0	-	6,871,536	First Rd E, Involves off-site stream work
	49	Elfrida (Res)	66	14,850	2.64	2,348,438	891,000	3,239,438	100	3,239,438	-	3,239,438	0	-	3,239,438	Second Rd E, Involves off-site stream work
	50	Elfrida (Res)	130.75	29,419	5.23	4,652,399	1,765,125	6,417,524	100	6,417,524	-	6,417,524	0	-	6,417,524	Second Rd E, Involves off-site stream work
	51	Elfrida (Res)	38.5	8,663	1.54	1,369,922	519,750	1,889,672	100	1,889,672	-	1,889,672	0	-	1,889,672	u/s confluence u/s Fletcher
	52	Elfrida (Res)	102.25	23,006	4.09	3,638,300	1,380,375	5,018,675	100	5,018,675	-	5,018,675	0	-	5,018,675	Fletcher at Golf Club
	53	Elfrida (Res)	25.16	5,661	1.01	895,253	339,660	1,234,913	100	1,234,913	-	1,234,913	0	-	1,234,913	Fletcher at Golf Club ,Involves off-site stream work
	54	Elfrida (Res)	29.25	6,581	1.17	1,040,785	394,875	1,435,660	100	1,435,660	-	1,435,660	0	-	1,435,660	Golf Club E of 56, Involves off-site stream work
	55	Elfrida (Res)	48.75	10,969	1.95	1,734,642	658,125	2,392,767	100	2,392,767	-	2,392,767	0	-	2,392,767	Golf Club btwn 56 and Hendershott
	56	Elfrida (Res)	29.25	6,581	1.17	1,040,785	394,875	1,435,660	100	1,435,660	-	1,435,660	0	-	1,435,660	Golf Club W of Hendershott, Involves off-site stream work
	57	Elfrida (Res)	26	5,850	1.04	925,142	351,000	1,276,142	100	1,276,142	-	1,276,142	0	-	1,276,142	Gol Club at Hendershott, Involves off-site stream work
Total								**173,613,284**	**100**	**173,613,284**	**36,836,341**	**136,776,942**		**75,317,924**	**61,459,018**	

Total Residential	**61,459,018**	**100**	**61,459,018**	**-**	**61,459,018**		**-**	**61,459,018**	
Total Non-Residential	**112,154,266**	**100**	**112,154,266**	**36,836,341**	**75,317,924**		**75,317,924**	**-**	

APPENDIX F-2 - GRIDS-RELATED OPEN WATERCOURSES: EROSION CONTROL AND CHANNEL SYSTEM IMPROVEMENTS

Primary Dev. Areas	Location	Total Length of Downstream Watercourse to Assumed End-Point[3]	Fraction of Watercourse Assumed to Required Erosion Control[2]	Length of Erosion Control Works	Estimated Cost ($)	Land Cost	Estimated Total Cost ($)	Growth Related %	Net Total Assiciated Cost ($)	Remarks
Expansion to Airport SPA	Ancaster	1,303	0.2	260.6	195,450	117,270	312,720	100	312,720	
	North of Airport	-	0.2	-	-	-	-	100	-	
Potential New Busniess Park (In Existing Airport Spa)	West of Airport	24,231	0.2	4,846.2	3,634,650	2,180,790	5,815,440	100	5,815,440	
Potential Urban Boundary Expansion Area	South of Twenty Road West, north of Airport	-	0.2	-	-	-	-	100	-	
	Northwest of Golf Club Road and Second Road East	15,337	0.2	3,067.4	2,300,550	1,104,264	3,404,814	100	3,404,814	Residential
Grand Total							**9,532,974**	**100**	**9,532,974**	
Total Residential							**3,404,814**	**100**	**3,404,814**	
Total Non-Residential							**6,128,160**	**100**	**6,128,160**	

[2]-0.05 - Where Development Fraction is 0 - 25%
0.10 - Where Development Fraction is 26 - 49%
0.15 - Where Development Fraction is 50 - 74%
0.20 - Where Development Fraction is 75 - 100%

[3]Location where d/s of this point no erosion is deemed to occur from subject development; total drainage area to this point estimated as a maximum of 2X the study watershed area.

[4]$1500/m for Watershed Area > 500 ha
$750/m for Watershed Area < 500 ha

APPENDIX G
GO TRANSIT DEVELOPMENT CHARGE

APPENDIX G - GO TRANSIT DEVELOPMENT CHARGES

This Appendix establishes the recommended schedule of development charges for the GO Transit service to be imposed by the City of Hamilton.

The work contained within this report is an extension of the work undertaken in the June, 2006 City of Hamilton Development Charge Background Study for the GO Transit Service. A similar approach has been undertaken however information released by the Province is less detailed than in the past. Based upon discussions with the Provincial staff, the level of capital spending is anticipated to be in the same order of magnitude, and has been inflated to 2011 dollars. This appendix outlines the service standard and capital program and extends the discussion on the GO Transit service as it pertains to the proposed Development Charges.

The service standard established in June 2006 has been extended with the number of GO rail stations per capita and number of GO rail weekday train stops per capita assumed to have maintained the same level as in 2006. Table G-1 provides the Level of Service Measure.

Table G-2 of the June, 2006 Development Charge Report has been updated to 2011 dollars and calculates the City of Hamilton's contribution to the growth capital program (Table G-2). The City of Hamilton is required by the Province to contribute 2.8% of the municipal share of the GO Transit growth capital program. This percentage has been fixed for several years and is not expected to vary significantly in the future. The 2.8% is Hamilton share of the 1/3 municipal share of GO Transit's total growth capital program, excluding projects that require no funding from GTA/H municipalities and a 2% deduction for benefit provided beyond the GTA/H.

The GO Transit Service is attributable entirely to residential development. The total growth related portion of capital works attributable to Hamilton is $4,298,096 (after the mandatory 10% deduction); this amount has been included in the DC calculation.

Table G-1
Level of Service Measures

GO Rail stations/Capita (Quantity)												stations	population	average	est. number	forecast	stations	service
												10-year	10-year	stations	stations	population	per	level
Municipality	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010		average	average	per million	2021	2021	million	change
Hamilton	1	1	1	1	1	1	1	1	1	1		1	503,779	2	1	534,362	2	**-0.06**

GO Rail Weekday Train Stops/Capita (Quality)												stops	population	average	est. number	forecast	stops	service
												10-year	10-year	stops	stops	population	per million	level
Municipality	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010		average	average	per million	2021*	2021	2021	change
Hamilton	7	7	7	7	7	7	7	7	7	7		7	503,779	14	11	534,362	21	**0.48**

*** Estimated number of stops for 2021 is based on the 2015 forecasted number of stops**

TABLE G-2
INFRASTRUCTURE COSTS COVERED IN THE DC CALCULATION

City of Hamilton
Service: GO Transit

Prj.No	Increased Service Needs Attributable to Anticipated Development 2011-2020	Timing (year)	Gross Capital Cost Estimate (2011$)	Projects which do not require funding from GTA/H	Net Capital Cost	Deduction for Benefit Beyond GTA/H (2%)	Net Capital Cost	Less: Grants, Subsidies and Other Contributions Attributable to New Development	Subtotal	Less: Other Municipalities Share of Costs	Total Hamilton Share (2.8%)	Less: Existing Benefit	Subtotal	Less: Other (e.g. 10% Statutory Deduction)	Potential DC Recoverable Cost: Total	Residential Share 100%	Non-Residential Share 0%
1	Total Growth Capital Plan	2011-2020	1,929,244,000	256,410,887	1,672,833,113	33,456,662	1,639,376,450	1,092,917,634	546,458,817	531,157,970	15,300,847	10,525,185	4,775,662	477,566	4,298,096	4,298,096	0
	Total		**1,929,244,000**	**256,410,887**	**1,672,833,113**	**33,456,662**	**1,639,376,450**	**1,092,917,634**	**546,458,817**	**531,157,970**	**15,300,847**	**10,525,185**	**4,775,662**	**477,566**	**4,298,096**	**4,298,096**	**0**

APPENDIX H
PROPOSED DEVELOPMENT CHARGE BY-LAW FOR WATER, WASTEWATER, STORMWATER AND GO TRANSIT SERVICES AND PROPOSED AMENDMENT TO DEVELOPMENT CHARGE BY-LAW 09-143 (AS AMENDED BY BY-LAW 09-228)

THE CORPORATION OF THE CITY OF HAMILTON

UNDER SEPARATE COVER