DEVELOPMENT CHARGES BACKGROUND STUDY

Region of Waterloo

Staff Consolidated Final Report

HEMSON Consulting Ltd

June 2014

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November 4, 2014

Calvin Barrett
Director, Financial Services and Development Financing
Region of Waterloo
150 Frederick Street, 4th Floor
Kitchener, Ontario N2G 4J3

Dear Mr. Barrett:

Re: Region of Waterloo 2014 Development Charges Background Study

Hemson Consulting Ltd. is pleased to submit a 2014 Development Charges Background Study for the Region of Waterloo. The report is the culmination of several months of work by the consulting team, and Regional staff and Council.

The study contains the maximum permissible development charge rates the Region could impose under the *Development Charges Act*. The Staff Consolidation Report included herein reflects all changes affecting the development charges rates that were approved by Regional Council on June 27, 2014.

We would like to thank you and other Regional staff for the valuable assistance throughout the course of the study, and we look forward to continuing to provide consulting services to the Region in the future.

Yours very truly,

HEMSON Consulting Ltd.

Stefan Krzeczunowicz
Senior Consultant

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EXECUTIVE SUMMARY

(i) BACKGROUND

- The *Development Charges Act, 1997* (*DCA*), and its associated regulation (*O. Reg. 82/98*), allow municipalities in Ontario to recover development-related capital costs from new development.

- The Region of Waterloo is growing and is also an attractive location for a wide variety of development. The anticipated development in the Region will increase the demand on municipal services.

- The Region wishes to continue implementing development charges to fund capital projects related to development throughout the Region so that development continues to be serviced in a fiscally responsible manner.

(ii) INTRODUCTION

- The *DCA* and *O. Reg. 82/98* require that a development charge background study be prepared in which development charges are determined with reference to:

    - A forecast of the amount, type and location of housing units, population and non-residential development anticipated in the Region;

    - The average capital service levels provided in the Region over the ten year period immediately preceding the preparation of the background study;

    - A review of future capital projects, including an analysis of gross expenditures, funding sources, and net expenditures incurred or to be incurred by the Region to provide for the expected development, including the determination of the growth and non-growth-related components of the capital projects; and

- An examination of the long term capital and operating costs for the capital infrastructure required for each service to which the development charges by-laws would relate.

- This report identifies the development-related net capital costs which are attributable to development that is forecast to occur in the Region. These costs are apportioned to types of development (residential; non-residential) in a manner that reflects the increase in the need for each service attributable to each type of development. This report therefore presents development charges for each type of development.

(iii) DEVELOPMENT FORECAST

- The Region of Waterloo is growing. Meeting the servicing demands of new development will require the Region to expand the capacity of municipal infrastructure.

- The following is a summary of the projected development for the Region:

	Region of Waterloo		
	2013 Estimate[1]	2014-2023 Growth	Forecast 2023
Residential			
Households	203,128	43,789	246,917
Population			
Census plus students	543,733	100,035	643,768
In new households		105,151	
Non-Residential			
Employment	291,440	41,010	332,450
New non-residential building space (m^2)		2,366,537	

1. The equivalent total population year-end estimate (2013) is approximately 562,000.

(iv) ALL ELIGIBLE SERVICES ARE INCLUDED IN THE ANALYSIS

- The following Regional services have been included in the development charge analysis:

    - Regional Library
    - Waterloo Regional Police Service
    - Emergency Medical Services
    - Airport
    - Transit
    - General Government
    - Operations and Facilities
    - Transportation
    - Water
    - Wastewater

- The Region has existing infrastructure for the provision of these services. The historical service levels for each of the services are shown in Section IV.

(v) THE REGION HAS AN EXTENSIVE DEVELOPMENT-RELATED CAPITAL PROGRAM FOR THE PROVISION OF ELIGIBLE SERVICES

- The capital infrastructure plans for all services are based on the ten year planning period of 2014 to 2023.

General Services

- The Region's development-related capital program for general services amounts to $262.3 million.

- Of the $262.3 million development-related capital program, approximately $65.5 million has been identified as eligible for recovery through development charges.

- The following is a summary of the development-related capital program for the general services:

Service	Development-Related Capital Program Gross Cost ($000)	Net Cost ($000)	RDC Eligible Cost ($000)
1.00 TOTAL - REGIONAL LIBRARY	**$1,300.0**	**$1,300.0**	**$1,170.0**
1.1 No Buildings or Land	$0.0	$0.0	$0.0
1.2 Material and Furnishings Acquisitions	$1,300.0	$1,300.0	$1,170.0
2.00 TOTAL - WATERLOO REGIONAL POLICE SERVICE	**$12,211.7**	**$12,211.7**	**$10,832.2**
2.1 Buildings, Land & Furnishings	$5,123.0	$5,123.0	$3,743.5
2.2 Vehicles and Equipment	$717.5	$717.5	$717.5
2.3 Recovery of Committed Excess Capacity	$6,371.2	$6,371.2	$6,371.2
3.00 TOTAL - EMERGENCY MEDICAL SERVICES	**$7,515.9**	**$7,515.9**	**$3,655.2**
3.1 Buildings, Land & Furnishings	$6,879.9	$6,879.9	$3,372.6
3.2 Vehicles	$636.0	$636.0	$282.6
3.3 Other Capital	$0.0	$0.0	$0.0
4.00 TOTAL - AIRPORT	**$36,212.0**	**$36,212.0**	**$14,901.2**
4.1 Capital Projects - Res. and Non-Res. Benefit	$29,504.0	$29,504.0	$10,100.6
4.2 Capital Projects - Non-Residential Benefit Only	$6,708.0	$6,708.0	$4,800.6
5.00 TOTAL - TRANSIT	**$130,749.0**	**$130,749.0**	**$23,802.6**
5.1 Facilities	$98,020.0	$98,020.0	$21,756.6
5.2 Fleet	$18,000.0	$18,000.0	$1,673.9
5.3 Other Capital	$14,729.0	$14,729.0	$372.1
6.00 TOTAL - GENERAL GOVERNMENT	**$4,403.0**	**$4,403.0**	**$3,962.7**
6.1 Growth-Related Studies	$4,403.0	$4,403.0	$3,962.7
6.2 Debt on Administration Building (none remaining)	$0.0	$0.0	$0.0
7.00 TOTAL - OPERATIONS FACILITIES	**$69,913.7**	**$69,913.7**	**$7,170.7**
7.1 Facilities Upgrades and Expansions	$69,913.7	$69,913.7	$7,170.7
TOTAL - 10 YEAR GENERAL SERVICES	**$262,305.3**	**$262,305.3**	**$65,494.6**

- Details on the capital programs for each of the general services are provided in Appendix B.

Engineering Services

- The Region's development-related capital program for engineering services amounts to $2,230.4 million and provides for a wide range of infrastructure expansions.

- Of the $2,230.4 million development-related capital program, approximately $854.5 million has been identified as eligible for recovery through development charges.

- The following is a summary of the development-related capital program for the engineering services:

Service	Development-Related Capital Program		RDC Eligible Cost ($000)
	Gross Cost ($000)	Net Cost ($000)	
1.00 TOTAL - TRANSPORTATION	**$523,682.1**	**$523,682.1**	**$500,069.4**
1.1 INTERSECTION IMPROVEMENTS (DEVELOPMENT-RELAT	$81,345.0	$81,345.0	$65,895.5
1.2 DEVELOPMENT-RELATED TURN LANES	$13,790.0	$13,790.0	$13,342.5
1.3 NEW TRAFFIC SIGNAL INSTALLATIONS	$7,825.0	$7,825.0	$7,825.0
1.4 ROAD WIDENINGS	$255,159.1	$255,159.1	$247,508.4
1.5 NEW ROAD LINKS AND STUDIES	$124,268.0	$124,268.0	$124,203.0
1.6 NEW CYCLING LANES	$21,200.0	$21,200.0	$21,200.0
1.7 NEW SIDEWALKS	$20,095.0	$20,095.0	$20,095.0
2.00 TOTAL - WATER	**$635,712.3**	**$635,712.3**	**$144,834.4**
2.1 PLANNING & STUDIES	$53,608.0	$53,608.0	$18,193.8
2.2 INFRASTRUCTURE UPGRADES	$162,784.0	$162,784.0	$22,437.2
2.3 UPGRADES, EXPANSIONS & NEW FACILITIES	$163,873.0	$163,873.0	$40,906.6
2.4 NEW WATERMAINS	$82,441.0	$82,441.0	$35,061.1
2.5 OTHER RECOVERABLE PROJECTS (PRIOR OVERSIZED F	$173,006.3	$173,006.3	$28,235.7
3.00 TOTAL - WASTEWATER	**$1,070,997.9**	**$1,070,997.9**	**$209,626.6**
3.1 PLANNING & STUDIES	$11,525.0	$11,525.0	$5,278.7
3.2 INFRASTRUCTURE UPGRADES	$64,636.0	$64,636.0	$9,228.9
3.3 UPGRADES, EXPANSIONS & NEW FACILITIES	$586,694.0	$586,694.0	$148,163.6
3.4 BIOSOLIDS	$93,521.0	$93,521.0	$13,019.5
3.5 PRIOR OVERSIZED PROJECTS	$314,621.9	$314,621.9	$33,935.9
TOTAL - 10 YEAR ENGINEERING SERVICES	**$2,230,392.2**	**$2,230,392.2**	**$854,530.3**

- Details on the capital programs for transportation and water and wastewater are provided in Appendices C and D.

(*vi*) *DEVELOPMENT CHARGE RATES CALCULATED WITH REFERENCE TO THE DCA*

- Development charge rates have been established under the parameters and limitations of the *DCA*. This study provides the rationale and basis for the calculated rates.

- A Region-wide average cost approach is used to calculate development charges for most of the eligible services. This approach results in uniform charges throughout the Region with the exception of the charges for the Regional Library and Transit. Development charges for these three services are calculated based on the service area for each service.

- Based on the Region of Waterloo's development forecast, historical service levels, and development-related capital programs, the following residential development charge rates have been calculated:

	Residential Charge By Unit Type							
	Singles & Semis		Townhouses		Apartments		Lodging Units	
	Urban Area	Township	Urban Area	Township	Urban Area	Township	Urban Area	Township
REGIONAL LIBRARY	$0	$210	$0	$158	$0	$114	$0	$65
WATERLOO REGIONAL POLICE SERVICE	$257	$257	$193	$193	$140	$140	$79	$79
EMERGENCY MEDICAL SERVICES	$93	$93	$70	$70	$50	$50	$29	$29
AIRPORT	$223	$223	$167	$167	$121	$121	$69	$69
TRANSIT	$788	$0	$592	$0	$429	$0	$243	$0
GENERAL GOVERNMENT	$109	$109	$81	$81	$59	$59	$33	$33
OPERATIONS AND FACILITIES	$118	$118	$89	$89	$64	$64	$36	$36
SUBTOTAL GENERAL SERVICES	**$1,588**	**$1,009**	**$1,192**	**$758**	**$865**	**$550**	**$489**	**$311**
TRANSPORTATION	$10,288	$10,288	$7,724	$7,724	$5,603	$5,603	$3,166	$3,166
WATER	$2,385	$2,385	$1,790	$1,790	$1,299	$1,299	$734	$734
WASTEWATER	$5,595	$5,595	$4,201	$4,201	$3,047	$3,047	$1,722	$1,722
SUBTOTAL ENGINEERING SERVICES	**$18,268**	**$18,268**	**$13,715**	**$13,715**	**$9,949**	**$9,949**	**$5,621**	**$5,621**
TOTAL DEVELOPMENT CHARGE	**$19,856**	**$19,278**	**$14,907**	**$14,473**	**$10,814**	**$10,499**	**$6,110**	**$5,932**

- The proposed residential charges are recommended to vary by unit type, reflecting the different occupancy patterns expected in various unit types and the associated differences in demand that would be placed on municipal services.

- As with the residential charges, based on the Region of Waterloo's development forecast, historical service levels, and development-related capital programs, the following non-residential development charge rates have been calculated:

Service	Non-Residential Charge			
	Urban Areas		Townships	
	per m^2	per ft^2	per m^2	per ft^2
REGIONAL LIBRARY	$0.00	$0.00	$0.00	$0.00
WATERLOO REGIONAL POLICE SERVICE	$1.54	$0.14	$1.54	$0.14
EMERGENCY MEDICAL SERVICES	$0.56	$0.05	$0.56	$0.05
AIRPORT	$3.05	$0.28	$3.05	$0.28
TRANSIT	$4.72	$0.44	$0.00	$0.00
GENERAL GOVERNMENT	$0.65	$0.06	$0.65	$0.06
OPERATIONS AND FACILITIES	$0.73	$0.07	$0.73	$0.07
SUBTOTAL GENERAL SERVICES	**$11.25**	**$1.05**	**$6.53**	**$0.61**
TRANSPORTATION	$61.48	$5.71	$61.48	$5.71
WATER	$13.19	$1.23	$13.19	$1.23
WASTEWATER	$30.81	$2.86	$30.81	$2.86
SUBTOTAL ENGINEERING SERVICES	**$105.48**	**$9.80**	**$105.48**	**$9.80**
TOTAL DEVELOPMENT CHARGE	**$116.73**	**$10.84**	**$112.01**	**$10.41**

I INTRODUCTION

The *Development Charges Act, 1997 (DCA)*, and its associated *Ontario Regulation 82/98* (*O. Reg. 82/98*), allow municipalities in Ontario to recover development-related capital costs from new development. This Region of Waterloo Development Charges Background Study is presented as part of a process to establish development charge by-laws that comply with this legislation.

The Region of Waterloo is growing and is also an attractive location for a variety of non-residential development. The anticipated development in the Region will increase the demand on municipal services. The Region wishes to implement development charges to fund capital projects related to development in the Region so that development continues to be serviced in a fiscally responsible manner.

The *DCA* and *O. Reg. 82/98* require that a development charges background study be prepared in which development charges are determined with reference to:

A. A forecast of the amount, type and location of development anticipated in the Region;

B. The average capital service levels provided in the Region over the ten year period immediately preceding the preparation of the background study;

C. A review of future capital projects, including an analysis of gross expenditures, funding sources, and net expenditures incurred or to be incurred by the Region or its local boards to provide for the anticipated development, including the determination of the development and non-development-related components of the capital projects; and

D. An examination of the long term capital and operating costs for the capital infrastructure required for each service to which the development charges by-laws would relate.

This study identifies the development-related net capital costs which are attributable to development that is forecast to occur in the Region. The costs are apportioned to types of development (residential and non-residential) in a manner that reflects the increase in the need for each service attributable to each type of development. The study therefore calculates development charges for each type of development.

The *DCA* provides for a period of public review and comment regarding the proposed development charges. This process includes considering and responding to comments received by members of the public about the proposed charges. Following completion of this process, and in accordance with the *DCA* and Council's review of this study, it is intended that Council will pass a new development charge by-law for the Region.

The remainder of this study sets out the information and analysis upon which the proposed development charges are based.

Section II designates the services for which the development charges are proposed and the areas within the Region to which the development charges will apply. It also briefly reviews the methodologies that have been used in this background study.

Section III presents a summary of the forecast residential and non-residential development which is expected to occur within the Region over a ten year planning horizon: the period 2014 to 2023.

Section IV summarizes the ten year historical average capital service levels that have been attained in the Region which form the basis for the development charge calculations.

In Section V, the development-related capital forecast that has been developed by various Regional departments is reviewed.

Section VI summarizes the calculation of applicable development charges and the resulting proposed development charges by class and type of development.

Section VII provides an examination of the long term capital and operating costs for each service included in the development charge calculation.

II A REGION-WIDE APPROACH TO ALIGN DEVELOPMENT-RELATED COSTS AND BENEFITS IS PROPOSED

Several key steps are required when calculating any development charge. However, specific circumstances arise in each municipality which must be reflected in the calculation. In this study, therefore, we have tailored our approach to the Region of Waterloo's unique circumstances. The approach to the proposed development charges is focused on providing a reasonable alignment of development-related costs with the development that necessitates them. Generally, this study uses a Region-wide approach for all services which the Region provides.

A. REGION-WIDE DEVELOPMENT CHARGES ARE PROPOSED

The Region provides a range of services to the community it serves and has a sizeable inventory of facilities, land, infrastructure, vehicles and equipment. The *DCA* provides the Region with flexibility when defining services that will be included in the development charge by-laws, provided that the other provisions of the *Act* and *Regulations* are met. The *DCA* also permits the Region to designate, in its by-laws, the areas within which the development charges shall be imposed. The charges may apply to all lands in the Region or to other designated development areas as specified in the by-laws.

For most of the development charge eligible services that the Region provides, the full range of capital facilities, land, equipment and infrastructure is available throughout the Region. All Regional residents therefore have access to all facilities. A widely accepted method for sharing the development-related capital costs for such services is to apportion them over all new development anticipated in the Region. The majority of services considered in this study are treated as Region-wide services. Development charges for three additional Regional services are based on development in the area to which each service relates. Charges for the transit service are based on forecasts of development in the Region's urban area (the Cities of Kitchener, Cambridge and Waterloo). Charges for the Regional Library service are based on development forecasts for the Townships. Charges for the Airport are based on development forecasts for the area served by the Airport.

The following services are included in the development charge calculation:

- Regional Library
- Waterloo Regional Police Service
- Emergency Medical Services
- Airport
- Transit
- General Government
- Operations and Facilities
- Transportation
- Water
- Wastewater

These services form a reasonable basis on which to plan and administer the Region's development charges. It is noted that the analysis of each of these services examines the individual capital facilities and equipment that make them up. For example, the Waterloo Regional Police Service includes the police stations and associated land, vehicles, furniture and equipment.

The resulting development charge for all of the above services would be imposed uniformly against all new development everywhere in the Region with the exception of the Regional Library and Transit services, which would be imposed on development in the Townships and urban areas respectively.

B. KEY STEPS WHEN DETERMINING DEVELOPMENT CHARGES FOR FUTURE DEVELOPMENT-RELATED PROJECTS

Several key steps are required when calculating development charges for future development-related projects. They are summarized below.

1. Development Forecast

The first step in the methodology requires that a development forecast be prepared for the ten year study period, 2014 to 2023. The forecast of future residential and non-residential development used in this study was prepared in conjunction with the Region's planning staff.

For the residential portion of the forecast, a projection of both the net population growth as well as the population growth in new housing units is required. The net population growth is equivalent to the population in new housing units less the change in population in existing units. The net population growth determines the need for additional facilities and provides the foundation for the development-related capital program.

When calculating the development charge, however, the development-related net capital costs are spread over the total additional population that will result from the addition of new housing units. This population in new units represents the population from which development charges will be collected.

The non-residential portion of the forecast estimates the amount of building space to be developed in the Region over the ten year period, 2014 to 2023. Factors for floor space per worker by employment category are used to convert the floorspace forecast into employment for the purposes of allocating development-related capital costs.

2. Service Categories and Historical Service Levels

The *DCA* states that the increase in the need for service attributable to anticipated development:

> ... must not include an increase that would result in the level of service exceeding the average level of that service provided in the municipality over the 10-year period immediately preceding the preparation of the background study...(s. 5. (1) 4.)

Historical ten year average service levels thus form the basis for the development charge calculation. A review of the Region's capital service levels for buildings, land, vehicles, equipment and so on has therefore been prepared as a reference for the calculation so that the portion of future capital projects that may be included in the development charge can be determined. The historical service levels used in this study have been calculated based on the period 2004 to 2013.

Historical service levels have been calculated for the transportation service. For the other "hard" services of water and wastewater, historical service levels are less applicable as new infrastructure is required to meet engineering standards.

3. Development-Related Capital Forecast and Analysis of Net Capital Costs to be Included in Development Charges

A development-related capital forecast has been prepared by the Region's departments as part of the study. The forecast identifies development-related projects and their gross and net costs, after allowing for capital grants, subsidies or other contributions as required by the *DCA s.5.(2)*. The capital forecast provides another cornerstone upon which development charges are based. The *DCA* requires that the increase in the need for service attributable to the anticipated development may include an increase:

> ... only if the council of the municipality has indicated that it intends to ensure that such an increase in need will be met. (s. 5. (1) 3.)

In conjunction with the *DCA, s. 5. (1) 4.* referenced above, these sections have the effect of requiring that the development charge be calculated on the lesser of the historic ten year average service levels or the service levels embodied in future plans of the Region. The development-related capital forecast prepared for this study ensures that development charges are only imposed to help pay for projects that have been or are intended to be purchased or built in order to accommodate future anticipated development. It is not sufficient in the calculation of development charges merely to have had the service in the past. There must also be a demonstrated commitment to continue to emplace facilities or infrastructure in the future. In this regard, *Ontario Regulation 82/98, s. 3* states that:

> For the purposes of paragraph 3 of subsection 5 (1) of the *Act,* the council of a municipality has indicated that it intends to ensure that an increase in the need for service will be met if the increase in service forms part of an official plan, capital forecast or similar expression of the intention of the council and the plan, forecast or similar expression of the intention of the council has been approved by the council.

For some projects in the development-related capital forecast, a portion of the project may confer benefits to existing residents. As required by the *DCA, s. 5. (1) 6.*, these portions of projects and their associated net costs are the funding responsibility of the Region from non-development charges sources. The amount of financing for such non-growth shares of projects is also identified as part of the preparation of the development-related capital forecast.

There is also a requirement in the *DCA* to reduce the applicable development charge by the amount of any "uncommitted excess capacity" that is available for a service. Such capacity is available to partially meet the future servicing requirements. Adjustments are made in the analysis to meet this requirement of the *Act*.

Finally, when calculating development charges, the development-related net capital costs must be reduced by ten per cent for all services except engineered services, such as roads and related and stormwater infrastructure, and protection services (*DCA, s. 5. (1) 8*). The ten per cent discount is applied to the other services, e.g. the Regional Library and Emergency Medical Services, and the resulting financing responsibility from non-development charge sources is identified.

4. Attribution to Types of Development

The next step in the determination of development charges is the allocation of the development-related net capital costs between the residential and the non-residential sectors. In the Region of Waterloo the allocation is based on the consideration of numerous factors including projected changes in population and employment over the planning periods and the anticipated demand for services.

The residential component of the development charge is applied to different housing types based on average occupancy factors. The non-residential component is applied on the basis of gross building space in square feet.

5. Final Adjustment

The final determination of the development charge results from adjustments made to development-related net capital costs for each service and sector resulting from a cashflow analysis that takes account of the timing of projects and receipt of development charges. Interest earnings or borrowing costs are therefore accounted for in the calculation as allowed under the *DCA*.

III DEVELOPMENT FORECAST

The following section provides a summary of the development forecasts that have been used as inputs to the development charges calculation for the Region of Waterloo. A more detailed summary of the forecasts, including tables illustrating historic trends and forecast results, is provided in Appendix A.

Development charges for the general services and transportation are based on Region-wide forecasts. Charges for transit are based on forecasts of development in the Region's urban area (the Cities of Kitchener, Cambridge and Waterloo). Charges for the Regional library service are based on development forecasts for the Townships. Capital planning and development charges for the water and wastewater services are based on service area development forecasts which have been provided by the Region as part of its *2013 Water and Wastewater Monitoring Report*.

A. RESIDENTIAL FORECAST IS FOR POPULATION GROWTH IN NEW UNITS OF 105,151 BETWEEN 2014 AND 2023

Development charges are levied on residential development as a charge per new unit. Therefore, for the residential forecast, a projection of both the population growth as well as the population in new housing units is required.

- The population growth determines the need for additional facilities and provides the foundation for the development-related capital program.

- When calculating the development charge, however, the development-related net capital costs are spread over the total additional population that occupy new housing units. This population in new units represents the population from which development charges will be collected.

The total ten-year net population growth is forecast to be 100,035. The total ten-year population growth in new units is forecast to be 105,151 for the Region, 88,165 for the Cities and 16,986 for the Townships.

B. NON-RESIDENTIAL FORECAST IS FOR 2,366,537 SQUARE METRES OF ADDITIONAL GFA BETWEEN 2014 AND 2023

Development charges are levied on non-residential development as a charge per unit of gross floor area (GFA). As with the residential forecast, the non-residential forecast requires both a projection of employment growth as well as a projection of the employment growth associated with new floorspace in the Region.

In order to estimate the number of employees in new floorspace, an assumed floorspace per worker (FSW) for each employment category is then applied to the new floorspace forecast. The following FSW assumptions have been used:

Industrial	80 m^2 per employee
Commercial	42 m^2 per employee
Institutional	50 m^2 per employee

The Region's net employment growth is estimated at 41,010 jobs over the ten year period to 2023. The total ten year new GFA forecast is 2,366,537 m^2 for the Region, 2,062,796 m^2 for the Cities, and 303,741 m^2 for the Townships.

Table 1 summarizes the development charge development forecast for the Region.

TABLE 1

REGION OF WATERLOO
2014 DEVELOPMENT CHARGES BACKGROUND STUDY
RESIDENTIAL AND NON-RESIDENTIAL DEVELOPMENT FORECAST

	Region of Waterloo		
	2013 Estimate[1]	**2014-2023 Growth**	**Forecast 2023**
Residential			
Households	203,128	43,789	246,917
Population			
Census plus students	543,733	100,035	643,768
In new households		105,151	
Non-Residential			
Employment	291,440	41,010	332,450
New non-residential building space (m^2)		2,366,537	

1. The equivalent total population year-end estimate (2013) is approximately 562,000.

IV HISTORICAL CAPITAL SERVICE LEVELS

The *DCA* and *O. Reg. 82/98* require that the development charges be set at a level no higher than the average service level provided in the Region over the ten year period immediately preceding the preparation of the background study, on a service by service basis.

For non-engineering services (Regional Library, Transit, etc.) the legislative requirement is met by documenting service levels for the preceding ten years: in this case, for the period 2004 – 2013. Typically, service levels for non-engineering services are measured as a ratio of inputs per capita or inputs per capita and employment. With engineering services such as water and wastewater standards are used in lieu of inputs per capita.

O. Reg. 82/98 requires that when defining and determining historic service levels both the *quantity* and *quality* of service be taken into consideration. In most cases, the service levels are initially established in quantitative terms. For example, service levels for buildings are presented in terms of square feet per unit. The qualitative aspect is introduced by the consideration of the monetary value of the facility or service. In the case of buildings, for example, the cost would be shown in terms of dollars per square foot to replace or construct a facility of the same quality. This approach helps to ensure that the development-related capital facilities that are to be charged to new development reflect not only the quantity (number and size) but also the quality (value or cost) of service provided by the Region in the past. Both the quantitative and qualitative aspects of service levels used in the current analysis are based on information provided by Regional staff. This information is generally based on historical records and the Region's and surrounding municipalities' experience with costs to acquire or construct similar facilities, equipment and infrastructure.

Table 2 summarizes service levels for all services included in the development charge calculation. Appendix B provides detailed historical inventory data upon which the calculation of service levels is based for the general services. Appendices C and D provide the same for the engineering services of transportation and water and wastewater respectively.

TABLE 2

REGION OF WATERLOO
HISTORICAL AVERAGE SERVICE LEVELS
2004 - 2013

Service	Service Area	10 Year Average Service Level	
		$	Unit of Measure
REGIONAL LIBRARY	Townships	**$226.98**	$/capita
WATERLOO REGIONAL POLICE SERVICE	Region	**$157.73**	$/pop & emp
EMERGENCY MEDICAL SERVICES	Region	**$30.41**	$/pop & emp
AIRPORT	Airport service area	**$289.20**	$/pop & emp
TRANSIT	Transit Service Area[1]	**$238.15**	$/pop & emp
OPERATIONS AND FACILITIES	Region	**$71.13**	$/pop & emp
GENERAL GOVERNMENT	Region	**n/a**	$/pop & emp
TRANSPORTATION[2]	Region	**$4,680.57**	$/pop & emp
WATER AND WASTEWATER	Water & Wastewater service areas	**n/a**	engineering standards

1. Service area defined as Cities of Waterloo, Kitchener, Cambridge.
2. Service level also calculated based on transportation system level-of-service analysis prepared by Dillon Consulting Ltd. (see Appendix G).

V DEVELOPMENT-RELATED CAPITAL FORECAST

The *DCA* requires the Council of a municipality to express its intent to provide future capital facilities at the level incorporated in the development charges calculation. As noted above in Section II, *Ontario Regulation 82/98, s. 3* states that:

> For the purposes of paragraph 3 of subsection 5 (1) of the *Act,* the council of a municipality has indicated that it intends to ensure that an increase in the need for service will be met if the increase in service forms part of an official plan, capital forecast or similar expression of the intention of the council and the plan, forecast or similar expression of the intention of the council has been approved by the council.

A. A DEVELOPMENT-RELATED CAPITAL FORECAST IS PROVIDED FOR COUNCIL'S APPROVAL

Based on the development forecasts summarized in Section III and detailed in Appendix A, staff of the Region, in collaboration with the consultant, have developed a development-related capital forecast which sets out those projects that are required to service the anticipated development. For all services the capital plan covers the ten year period from 2014 to 2023.

One of the recommendations contained in this background study is for Council to adopt the development-related capital forecast developed for the purposes of the development charges calculation. It is assumed that future capital budgets and forecasts will continue to bring forward the capital projects presented here as they will be needed to service the anticipated development in the Region. It is however acknowledged that changes to the forecast presented here may occur through the Region's normal capital budget process.

B. DEVELOPMENT-RELATED CAPITAL FORECAST FOR GENERAL SERVICES

A summary of the development-related capital forecast for general services is presented in Table 3. The table shows that the gross cost of the Region's capital forecast is estimated to be $262.3 million. No grants or subsidies have been identified. Thus, the net cost of the development-related capital program remains $262.3 million.

TABLE 3

REGION OF WATERLOO
DEVELOPMENT-RELATED CAPITAL FORECAST
SUMMARY OF GENERAL SERVICES
2014 - 2023

Service	Capital Forecast			Total Net Capital Forecast ($000)									
	Gross Cost ($000)	Subsidies/ Recoveries ($000)	Net Cost ($000)	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
1.00 TOTAL - REGIONAL LIBRARY	**$1,300.0**	**$0.0**	**$1,300.0**	**$130.0**	**$130.0**	**$130.0**	**$130.0**	**$130.0**	**$130.0**	**$130.0**	**$130.0**	**$130.0**	**$130.0**
1.1 No Buildings or Land	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
1.2 Material and Furnishings Acquisitions	$1,300.0	$0.0	$1,300.0	$130.0	$130.0	$130.0	$130.0	$130.0	$130.0	$130.0	$130.0	$130.0	$130.0
2.00 TOTAL - WATERLOO REGIONAL POLICE SERVICE	**$12,211.7**	**$0.0**	**$12,211.7**	**$2,486.3**	**$4,125.8**	**$816.3**	**$672.8**	**$816.3**	**$601.4**	**$744.9**	**$601.4**	**$744.9**	**$601.4**
2.1 Buildings, Land & Furnishings	$5,123.0	$0.0	$5,123.0	$1,670.0	$3,453.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
2.2 Vehicles and Equipment	$717.5	$0.0	$717.5	$143.5	$0.0	$143.5	$0.0	$143.5	$0.0	$143.5	$0.0	$143.5	$0.0
2.3 Recovery of Committed Excess Capacity	$6,371.2	$0.0	$6,371.2	$672.8	$672.8	$672.8	$672.8	$672.8	$601.4	$601.4	$601.4	$601.4	$601.4
3.00 TOTAL - EMERGENCY MEDICAL SERVICES	**$7,515.9**	**$0.0**	**$7,515.9**	**$1,435.4**	**$153.0**	**$816.7**	**$923.2**	**$3,266.7**	**$759.9**	**$0.0**	**$161.0**	**$0.0**	**$0.0**
3.1 Buildings, Land & Furnishings	$6,879.9	$0.0	$6,879.9	$1,435.4	$0.0	$816.7	$762.2	$3,266.7	$598.9	$0.0	$0.0	$0.0	$0.0
3.2 Vehicles	$636.0	$0.0	$636.0	$0.0	$153.0	$0.0	$161.0	$0.0	$161.0	$0.0	$161.0	$0.0	$0.0
3.3 Other Capital	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
4.00 TOTAL - AIRPORT	**$36,212.0**	**$0.0**	**$36,212.0**	**$2,217.0**	**$3,825.0**	**$5,800.0**	**$1,130.0**	**$11,725.0**	**$165.0**	**$0.0**	**$350.0**	**$11,000.0**	**$0.0**
4.1 Capital Projects - Res. and Non-Res. Benefit	$29,504.0	$0.0	$29,504.0	$1,069.0	$815.0	$3,250.0	$1,130.0	$11,725.0	$165.0	$0.0	$350.0	$11,000.0	$0.0
4.2 Capital Projects - Non-Residential Benefit Only	$6,708.0	$0.0	$6,708.0	$1,148.0	$3,010.0	$2,550.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
5.00 TOTAL - TRANSIT	**$130,749.0**	**$0.0**	**$130,749.0**	**$27,580.3**	**$12,879.3**	**$9,231.3**	**$11,805.0**	**$28,400.0**	**$29,453.0**	**$5,475.0**	**$4,975.0**	**$475.0**	**$475.0**
5.1 Facilities	$98,020.0	$0.0	$98,020.0	$24,174.0	$5,548.0	$6,000.0	$9,945.0	$27,875.0	$24,478.0	$0.0	$0.0	$0.0	$0.0
5.2 Fleet	$18,000.0	$0.0	$18,000.0	$0.0	$2,500.0	$500.0	$1,000.0	$0.0	$4,500.0	$5,000.0	$4,500.0	$0.0	$0.0
5.3 Other Capital	$14,729.0	$0.0	$14,729.0	$3,406.3	$4,831.3	$2,731.3	$860.0	$525.0	$475.0	$475.0	$475.0	$475.0	$475.0
6.00 TOTAL - GENERAL GOVERNMENT	**$4,403.0**	**$0.0**	**$4,403.0**	**$1,223.0**	**$480.0**	**$615.0**	**$285.0**	**$500.0**	**$200.0**	**$200.0**	**$200.0**	**$500.0**	**$200.0**
6.1 Growth-Related Studies	$4,403.0	$0.0	$4,403.0	$1,223.0	$480.0	$615.0	$285.0	$500.0	$200.0	$200.0	$200.0	$500.0	$200.0
6.2 Debt on Administration Building (none remaining)	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
7.00 TOTAL - OPERATIONS AND FACILITIES	**$69,913.7**	**$0.0**	**$69,913.7**	**$2,620.8**	**$9,842.8**	**$13,542.3**	**$3,367.0**	**$5,651.8**	**$13,301.8**	**$15,341.8**	**$6,161.8**	**$41.8**	**$41.8**
7.1 Facilities Upgrades and Expansions	$69,913.7	$0.0	$69,913.7	$2,620.8	$9,842.8	$13,542.3	$3,367.0	$5,651.8	$13,301.8	$15,341.8	$6,161.8	$41.8	$41.8
TOTAL - 10 YEAR GENERAL SERVICES	**$262,305.3**	**$0.0**	**$262,305.3**	**$37,692.9**	**$31,436.0**	**$30,951.7**	**$18,313.0**	**$50,489.8**	**$44,611.1**	**$21,891.7**	**$12,579.2**	**$12,891.7**	**$1,448.2**

Of this $262.3 million net capital cost, approximately $130.8 million (50 per cent) is related to capital works for the Transit service, including $98.0 million for new facilities and $18.0 million for additional vehicles. Another $69.9 million (27 per cent) is required to fund expansions to the Operations and Facilities capital infrastructure. The cost of adding new infrastructure to the Airport totals $36.2 million (14 per cent). New infrastructure for the Waterloo Regional Police Service, Emergency Medical Services, and the Regional Library add another $12.2 million (5 per cent), $7.5 million (3 per cent), and $1.3 million (1 per cent) to the capital forecast respectively. That portion of the Region's forecast which relates to the provision of development-related studies is referred to as General Government. It amounts to $4.4 million, or 2 per cent of the total.

This capital forecast incorporates those projects identified to be related to development anticipated in the next ten years. It is not implied that all of these costs are to be recovered from new development by way of development charges (see the following Section VI for the method and determination of net capital costs attributable to development). Portions of this capital forecast may relate to replacement of existing capital facilities, to shares of projects that benefit the existing community, or to development anticipated to occur beyond the 2014–2023 planning period. In the case of the Transit service, for example, only $23.8 million of the $130.8 million net cost of the capital program (18 per cent) is recoverable through development charges at this time. In addition to these reductions, the amounts shown on Table 3 have not been reduced by ten per cent for various "soft" services as required by *s. 5 (1) 8* of the *DCA*.

After these reductions the remaining development-related capital costs are brought forward to the development charge calculation. Further details on the capital plans for each individual general service category are available in Appendix B.

C. DEVELOPMENT-RELATED CAPITAL FORECAST FOR ENGINEERING INFRASTRUCTURE

Table 4 presents a summary of the development-related capital forecast for the Region's engineering infrastructure of transportation, water, and wastewater, over the period 2014 to 2023. The table shows that the gross cost of the Region's engineering service capital forecast is estimated to be $2,230.4 million. No grants or subsidies have been identified. Thus, the net cost of the development-related capital program remains $2,230.4 million.

Appendices C and G provide details on the development capital forecast for transportation. Details on the capital forecast for water and wastewater are set out in Appendix D.

TABLE 4

REGION OF WATERLOO
DEVELOPMENT-RELATED CAPITAL FORECAST
SUMMARY OF ENGINEERING SERVICES
2014 - 2023

Service	Capital Forecast			Total Net Capital Forecast ($000)									
	Gross Cost ($000)	Subsidies/ Recoveries ($000)	Net Cost ($000)	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
1.00 TOTAL - TRANSPORTATION	**$523,682.1**	**$0.0**	**$523,682.1**	**$92,851.7**	**$72,999.7**	**$79,501.7**	**$53,330.0**	**$66,770.0**	**$32,650.0**	**$35,340.0**	**$13,355.0**	**$39,964.1**	**$36,920.0**
1.1 INTERSECTION IMPROVEMENTS (DEVELOPMENT-RELATED)	$81,345.0	$0.0	$81,345.0	$27,590.0	$14,150.0	$10,140.0	$9,955.0	$3,515.0	$4,550.0	$2,090.0	$2,250.0	$5,130.0	$1,975.0
1.2 DEVELOPMENT-RELATED TURN LANES	$13,790.0	$0.0	$13,790.0	$1,850.0	$290.0	$990.0	$1,535.0	$835.0	$1,925.0	$1,480.0	$1,835.0	$1,650.0	$1,400.0
1.3 NEW TRAFFIC SIGNAL INSTALLATIONS	$7,825.0	$0.0	$7,825.0	$2,525.0	$1,200.0	$600.0	$500.0	$500.0	$500.0	$500.0	$500.0	$500.0	$500.0
1.4 ROAD WIDENINGS	$255,159.1	$0.0	$255,159.1	$46,830.0	$41,255.0	$36,975.0	$6,900.0	$30,565.0	$19,785.0	$28,905.0	$2,985.0	$15,964.1	$24,995.0
1.5 NEW ROAD LINKS AND STUDIES	$124,268.0	$0.0	$124,268.0	$11,471.7	$13,609.7	$21,391.7	$29,635.0	$27,820.0	$2,030.0	$700.0	$3,055.0	$12,585.0	$1,970.0
1.6 NEW CYCLING LANES	$21,200.0	$0.0	$21,200.0	$1,710.0	$1,155.0	$3,970.0	$4,020.0	$1,975.0	$1,985.0	$875.0	$1,475.0	$1,250.0	$2,785.0
1.7 NEW SIDEWALKS	$20,095.0	$0.0	$20,095.0	$875.0	$1,340.0	$5,435.0	$785.0	$1,560.0	$1,875.0	$790.0	$1,255.0	$2,885.0	$3,295.0
2.00 TOTAL - WATER	**$635,712.3**	**$0.0**	**$635,712.3**	**$49,626.6**	**$44,390.6**	**$49,585.6**	**$56,360.6**	**$69,315.6**	**$75,000.6**	**$70,290.6**	**$77,180.6**	**$75,075.6**	**$68,885.6**
2.1 PLANNING & STUDIES	$53,608.0	$0.0	$53,608.0	$5,243.0	$4,090.0	$3,790.0	$3,900.0	$4,035.0	$4,500.0	$4,050.0	$8,000.0	$8,000.0	$8,000.0
2.2 INFRASTRUCTURE UPGRADES	$162,784.0	$0.0	$162,784.0	$12,344.0	$9,675.0	$12,795.0	$16,960.0	$17,280.0	$18,050.0	$17,340.0	$18,680.0	$19,875.0	$19,785.0
2.3 UPGRADES, EXPANSIONS & NEW FACILITIES	$163,873.0	$0.0	$163,873.0	$8,748.0	$5,225.0	$3,850.0	$7,600.0	$19,600.0	$28,350.0	$25,100.0	$25,800.0	$22,400.0	$17,200.0
2.4 NEW WATERMAINS	$82,441.0	$0.0	$82,441.0	$5,991.0	$8,100.0	$11,850.0	$10,600.0	$11,100.0	$6,800.0	$6,500.0	$7,400.0	$7,500.0	$6,600.0
2.5 OTHER RECOVERABLE PROJECTS (PRIOR OVERSIZED PRO.	$173,006.3	$0.0	$173,006.3	$17,300.6	$17,300.6	$17,300.6	$17,300.6	$17,300.6	$17,300.6	$17,300.6	$17,300.6	$17,300.6	$17,300.6
3.00 TOTAL - WASTEWATER	**$1,070,997.9**	**$0.0**	**$1,070,997.9**	**$69,486.2**	**$90,612.2**	**$107,062.2**	**$111,712.2**	**$101,777.2**	**$99,457.2**	**$126,692.2**	**$124,312.2**	**$119,574.2**	**$120,312.2**
3.1 PLANNING & STUDIES	$11,525.0	$0.0	$11,525.0	$1,025.0	$1,400.0	$1,700.0	$1,100.0	$650.0	$850.0	$850.0	$1,350.0	$1,650.0	$950.0
3.2 INFRASTRUCTURE UPGRADES	$64,636.0	$0.0	$64,636.0	$6,236.0	$4,100.0	$3,100.0	$6,100.0	$6,300.0	$7,300.0	$7,500.0	$8,000.0	$8,000.0	$8,000.0
3.3 UPGRADES, EXPANSIONS & NEW FACILITIES	$586,694.0	$0.0	$586,694.0	$28,442.0	$52,550.0	$70,300.0	$71,450.0	$58,265.0	$49,145.0	$70,180.0	$64,000.0	$59,462.0	$62,900.0
3.4 BIOSOLIDS	$93,521.0	$0.0	$93,521.0	$2,321.0	$1,100.0	$500.0	$1,600.0	$5,100.0	$10,700.0	$16,700.0	$19,500.0	$19,000.0	$17,000.0
3.5 PRIOR OVERSIZED PROJECTS	$314,621.9	$0.0	$314,621.9	$31,462.2	$31,462.2	$31,462.2	$31,462.2	$31,462.2	$31,462.2	$31,462.2	$31,462.2	$31,462.2	$31,462.2
TOTAL - 10 YEAR ENGINEERING SERVICES	**$2,230,392.2**	**$0.0**	**$2,230,392.2**	**$211,964.5**	**$208,002.5**	**$236,149.5**	**$221,402.8**	**$237,862.8**	**$207,107.8**	**$232,322.8**	**$214,847.8**	**$234,613.9**	**$226,117.8**

VI PROPOSED DEVELOPMENT CHARGES ARE CALCULATED IN ACCORDANCE WITH THE *DCA*

This section summarizes the calculation of development charges for each service category and the resulting total development charge by type of development. For all services, the calculation of the "unadjusted" per capita (residential) and per square metre (non-residential) charges is reviewed. Adjustments to these amounts resulting from a cashflow analysis that accounts for interest earnings and borrowing costs are also discussed.

For residential development, an adjusted total per capita amount is applied to different housing types on the basis of average occupancy factors. For non-residential development the proposed development charge rates are based on gross floor area (GFA) of building space.

It is noted that the calculation of the development charges does not include any provision for exemptions required under the *DCA*, for example, the exemption for enlargements of up to fifty per cent on existing industrial buildings. Such legislated exemptions, or other exemptions which Council may choose to provide, will result in a loss of development charge revenue for the affected types of development. Any such revenue loss may not be offset, however, by increasing other portions of the calculated charge.

A. DEVELOPMENT CHARGE CALCULATION

1. Unadjusted Residential and Non-Residential Development Charge Rates

A summary of the "unadjusted" residential and non-residential development charges for the general services is presented in Table 5. Further details of the calculation for each individual general service category are available in Appendix B.

The capital forecast for the general services incorporates those projects identified to be related to development anticipated in the next ten years. However, not all of the capital costs are to be recovered from new development by way of development charges. Table 5 shows that $86.7 million of the capital forecast relates to replacement of existing capital facilities or for shares of projects that provide benefit to the existing community. Another share of the forecast, $94.3 million, is either attributable to development beyond the 2023 period (and can therefore only be recovered under future development charge studies) or represents a service level increase in

TABLE 5

REGION OF WATERLOO
SUMMARY OF UNADJUSTED RESIDENTIAL AND NON-RESIDENTIAL DEVELOPMENT CHARGES
GENERAL SERVICES

10 Year Growth in Population in New Units		10 Year Growth in Square Metres	
Region	*105,151*	*Region*	2,366,537
Townships (for Regional Library)	*16,986*	*Townships*	303,741
Urban Area (for Transit)	*88,165*	*Urban Area (for Transit)*	2,062,796
Airport Service Area	*130,853*	*Airport Service Area*	3,175,279

	Development-Related Capital Forecast							Total Growth-Related Net Capital Costs After Discount ($000)	Residential Share		Non-Residential Share	
	Total (Net of Grants/ Subsidies) ($000)	Benefit to Existing or Replacement Share ($000)	Net Cost After Reserve Funds & Replacement ($000)	Post 2023 Benefit Share or Service Level Increase ($000)	Total Growth-Related Net Capital Costs ($000)	Service Discount Required %	Service Discount Required $000		%	$000	%	$000
1.00 REGIONAL LIBRARY	$1,300.0	$0.0	$1,300.0	$0.0	$1,300.0	10%	$130.0	$1,170.0	100%	$1,170.0	0%	$0.0
Unadjusted Development Charge Per Capita ($)										$68.88		
Unadjusted Development Charge Per m^2 ($)												$0.00
2.00 WATERLOO REGIONAL POLICE SERVICE	$12,211.7	$1,379.5	$10,832.2	$0.0	$10,832.2	0%	$0.0	$10,832.2	70%	$7,561.8	30%	$3,270.4
Unadjusted Development Charge Per Capita ($)										$71.91		
Unadjusted Development Charge Per m^2 ($)												$1.38
3.00 EMERGENCY MEDICAL SERVICES	$7,515.9	$0.0	$7,515.9	$3,109.1	$4,406.8	10%	$751.6	$3,655.2	70%	$2,551.7	30%	$1,103.6
Unadjusted Development Charge Per Capita ($)										$24.27		
Unadjusted Development Charge Per m^2 ($)												$0.47
4.00 AIRPORT	$36,212.0	$9,655.1	$26,556.9	$9,000.0	$17,556.9	10%	$2,655.7	$14,901.2	68%	$6,868.4	32%	$8,032.8
Unadjusted Development Charge Per Capita ($)										$52.49		
Unadjusted Development Charge Per m^2 ($)												$2.53
5.00 TRANSIT	$130,749.0	$12,941.3	$117,807.7	$82,224.4	$35,583.4	10%	$11,780.8	$23,802.6	69%	$16,420.07	31%	$7,382.53
Unadjusted Development Charge Per Capita ($)										$186.24		
Unadjusted Development Charge Per m2 ($)												$3.58
6.00 OPERATIONS AND FACILITIES	$69,913.7	$62,743.0	$7,170.7	$0.0	$7,170.7	0%	$0.0	$7,170.7	70%	$5,005.8	30%	$2,164.9
Unadjusted Development Charge Per Capita ($)										$47.61		
Unadjusted Development Charge Per m^2 ($)												$0.91
7.00 GENERAL GOVERNMENT	$4,403.0	$0.0	$4,403.0	$0.0	$4,403.0	10%	$440.3	$3,962.7	70%	$2,766.3	30%	$1,196.4
Unadjusted Development Charge Per Capita ($)										$26.31		
Unadjusted Development Charge Per m^2 ($)												$0.51
TOTAL - 10 YEAR GENERAL SERVICES	$262,305.3	$86,718.9	$175,586.4	$94,333.4	$81,253.0		$15,758.4	$65,494.6		$42,344.1		$23,150.6
Unadjusted Development Charge Per Capita ($)										$477.71		
Unadjusted Development Charge Per m^2 ($)												$9.38

the Region. In addition, the capital costs shown on Table 5 are reduced by the legislated ten per cent discount, or $15.8 million, for various "soft" services as mandated by *s. 5 (1) 8.* of the *DCA*.

The total net development-related capital costs eligible for recovery for the general services results in unadjusted development charges for these services of $477.71 per capita for residential development and $9.38 per square metre of new gross floor area (GFA) for non-residential development. These unadjusted development charges are displayed at the base of Table 5.

Table 6 presents the "unadjusted" residential and non-residential development charges for the engineering infrastructure of transportation, water, and wastewater. It shows that of the total net cost of the capital program, estimated to be $2,230.4 million, $1,032.9 million is considered to replace existing infrastructure or to benefit the existing population and $342.9 million is either attributable to development beyond the 2023 period (and can therefore only be recovered under future development charge studies) or represents a service level increase in the Region. The remaining $854.5 million is carried forward to the development charge calculation. Of this cost, $601.8 million has been allocated to new residential development and $252.7 million has been allocated to new non-residential development.

The allocation of engineered service costs yields unadjusted charges of $5,723.28 per capita for residential development and $106.80 per square metre for new non-residential development. Further details of the calculation for the transportation service are available in Appendix C. Further details of the calculation for the water and wastewater services are available in Appendix D.

2. Adjusted Residential and Non-Residential Development Charge Rates

Final adjustments to the "unadjusted" development charge rates are made through a cashflow analysis. The analysis, details of which are included in Appendices B through D, considers the borrowing cost and interest earnings associated with the timing of expenditures and development charge receipts for each service category. Table 7 summarizes the results of the adjustment for the residential component of the development charge rate. As shown, the adjusted per capita rate decreases by $27 from $6,201 per capita to $6,174 per capita after the cashflow analysis.

Table 7 also provides the calculated rates by residential unit with the total charge per unit ranging from a high of 19,856 per unit for single and semi detached units in the urban areas to a low of $5,932 per unit for lodging units in the Townships.

The calculated unadjusted and adjusted non-residential development charge rates are presented in Table 8. The calculated adjusted rate for new non-residential development is $10.84 per ft^2 in the urban areas and $10.41 per ft^2 in the Townships, which represents an increase of $0.05 per ft^2 in the Townships and a reduction of $0.05 per ft^2 in the urban areas.

TABLE 6

REGION OF WATERLOO
SUMMARY OF UNADJUSTED RESIDENTIAL AND NON-RESIDENTIAL DEVELOPMENT CHARGES
ENGINEERING SERVICES

10 Year Growth in Population in New Units	105,151
10 Year Growth in Square Metres	2,366,537

	Development-Related Capital Forecast							Total Growth-Related Net Capital Costs After Discount ($000)	Residential Share		Non-Residential Share	
	Total (Net of Grants/ Subsidies) ($000)	Benefit to Existing or Replacement Share ($000)	Net Cost After Benefit to Existing or Replacement ($000)	Post 2023 Benefit Share or Service Level Increase ($000)	Total Growth-Related Net Capital Costs ($000)	Service Discount Required %	Service Discount Required $000		%	$000	%	$000
1.00 TRANSPORTATION	$523,682.1	$23,612.75	$500,069.4	$0.0	$500,069.4	0%	$0.0	$500,069.4	70%	$349,092.3	30%	$150,977.0
Unadjusted Development Charge Per Capita ($)										$3,319.91		
Unadjusted Development Charge Per m^2 ($)												$63.80
2.00 WATER	$635,712.3	$380,203.6	$255,508.7	$110,674.3	$144,834.4	0%	$0.0	$144,834.4	71%	$103,261.2	29%	$41,573.1
Unadjusted Development Charge Per Capita ($)										$982.03		
Unadjusted Development Charge Per m^2 ($)												$17.57
3.00 WASTEWATER	$1,070,997.9	$629,108.6	$441,889.3	$232,262.7	$209,626.6	0%	$0.0	$209,626.6	71%	$149,455.6	29%	$60,171.0
Unadjusted Development Charge Per Capita ($)										$1,421.34		
Unadjusted Development Charge Per m^2 ($)												$25.43
TOTAL - 10 YEAR ENGINEERING SERVICES	$2,230,392.2	$1,032,924.9	$1,197,467.4	$342,937.0	$854,530.3		$0.0	$854,530.3		$601,809.1		$252,721.2
Unadjusted Development Charge Per Capita ($)										$5,723.28		
Unadjusted Development Charge Per m^2 ($)												$106.80

TABLE 7

REGION OF WATERLOO
2014 DEVELOPMENT CHARGES BACKGROUND STUDY
RESIDENTIAL DEVELOPMENT CHARGES BY UNIT TYPE

	Unadjusted Charge Per Capita	Adjusted Charge Per Capita	Residential Charge By Unit Type							
			Singles & Semis		Townhouses		Apartments		Lodging Units	
			Urban Area	Township	Urban Area	Township	Urban Area	Township	Urban Area	Township
REGIONAL LIBRARY	$69	$65	$0	$210	$0	$158	$0	$114	$0	$65
WATERLOO REGIONAL POLICE SERVICE	$72	$79	$257	$257	$193	$193	$140	$140	$79	$79
EMERGENCY MEDICAL SERVICES	$24	$29	$93	$93	$70	$70	$50	$50	$29	$29
AIRPORT	$52	$69	$223	$223	$167	$167	$121	$121	$69	$69
TRANSIT	$186	$243	$788	$0	$592	$0	$429	$0	$243	$0
GENERAL GOVERNMENT	$26	$33	$109	$109	$81	$81	$59	$59	$33	$33
OPERATIONS AND FACILITIES	$48	$36	$118	$118	$89	$89	$64	$64	$36	$36
SUBTOTAL GENERAL SERVICES	**$478**	**$553**	**$1,588**	**$1,009**	**$1,192**	**$758**	**$865**	**$550**	**$489**	**$311**
TRANSPORTATION	$3,320	$3,166	$10,288	$10,288	$7,724	$7,724	$5,603	$5,603	$3,166	$3,166
WATER	$982	$734	$2,385	$2,385	$1,790	$1,790	$1,299	$1,299	$734	$734
WASTEWATER	$1,421	$1,722	$5,595	$5,595	$4,201	$4,201	$3,047	$3,047	$1,722	$1,722
SUBTOTAL ENGINEERING SERVICES	**$5,723**	**$5,621**	**$18,268**	**$18,268**	**$13,715**	**$13,715**	**$9,949**	**$9,949**	**$5,621**	**$5,621**
TOTAL DEVELOPMENT CHARGE	**$6,201**	**$6,174**	**$19,856**	**$19,278**	**$14,907**	**$14,473**	**$10,814**	**$10,499**	**$6,110**	**$5,932**

(1) Based on Persons Per Unit Of:

Singles/Semis	*3.25*
Townhouses	*2.44*
Apartments	*1.77*
Lodging Units	*1.00*

TABLE 8

REGION OF WATERLOO
2014 DEVELOPMENT CHARGES BACKGROUND STUDY
NON-RESIDENTIAL DEVELOPMENT CHARGES PER SQUARE METRE/SQUARE FOOT OF GFA

	Non-Residential Charge							
	Unadjusted Charge				Adjusted Charge			
	Urban Areas		Townships		Urban Areas		Townships	
Service	per m^2	per ft^2	per m^2	per ft^2	per m^2	per ft^2	per m^2	per ft^2
REGIONAL LIBRARY	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
WATERLOO REGIONAL POLICE SERVICE	$1.38	$0.13	$1.38	$0.13	$1.54	$0.14	$1.54	$0.14
EMERGENCY MEDICAL SERVICES	$0.47	$0.04	$0.47	$0.04	$0.56	$0.05	$0.56	$0.05
AIRPORT	$2.53	$0.24	$2.53	$0.24	$3.05	$0.28	$3.05	$0.28
TRANSIT	$3.58	$0.33	$0.00	$0.00	$4.72	$0.44	$0.00	$0.00
GENERAL GOVERNMENT	$0.51	$0.05	$0.51	$0.05	$0.65	$0.06	$0.65	$0.06
OPERATIONS AND FACILITIES	$0.91	$0.08	$0.91	$0.08	$0.73	$0.07	$0.73	$0.07
SUBTOTAL GENERAL SERVICES	**$9.38**	**$0.87**	**$5.80**	**$0.54**	**$11.25**	**$1.05**	**$6.53**	**$0.61**
TRANSPORTATION	$63.80	$5.93	$63.80	$5.93	$61.48	$5.71	$61.48	$5.71
WATER	$17.57	$1.63	$17.57	$1.63	$13.19	$1.23	$13.19	$1.23
WASTEWATER	$25.43	$2.36	$25.43	$2.36	$30.81	$2.86	$30.81	$2.86
SUBTOTAL ENGINEERING SERVICES	**$106.80**	**$9.92**	**$106.80**	**$9.92**	**$105.48**	**$9.80**	**$105.48**	**$9.80**
TOTAL DEVELOPMENT CHARGE	**$116.18**	**$10.79**	**$112.60**	**$10.46**	**$116.73**	**$10.84**	**$112.01**	**$10.41**

B. COMPARISON OF NEWLY CALCULATED DEVELOPMENT CHARGES WITH CHARGES CURRENTLY IN FORCE IN REGION OF WATERLOO

Tables 9 and 10 present a comparison of the newly calculated residential and non-residential development charges with currently imposed development charge rates (as of January 1, 2014). The tables demonstrate that the newly calculated residential development charge rate for a single or semi-detached unit increases by $6,568 per single and semi-detached unit, or 49 per cent, in the urban areas, and by $6,342 per unit, or 49 per cent, in the Townships. The newly calculated development charge rate for non-residential development increases by $1.25 per ft^2, or 13 per cent, for the urban areas and by $1.18 per ft^2, or 13 per cent, for the Townships.

TABLE 9

REGION OF WATERLOO
2014 DEVELOPMENT CHARGES STUDY
COMPARISION OF CURRENT AND CALCULATED DEVELOPMENT CHARGES

	Residential Development Charge					
	Current Charge (1 Jan 2014) ($/sdu)[1]		Calculated Charge ($/sdu)		% Difference	
Service	Urban Areas	Township	Urban Areas	Township	Urban Areas	Township
REGIONAL LIBRARY[2]	$0	$186	$0	$210	n/a	13%
GENERAL GOVERNMENT[3]	$437	$437	$366	$366	-16%	-16%
Waterloo Regional Police			*$257*	*$257*		
General Government			*$109*	*$109*		
EMERGENCY MEDICAL SERVICES	$66	$66	$93	$93	40%	40%
AIRPORT	$184	$184	$223	$223	21%	21%
TRANSIT[4]	$538	$0	$788	$0	46%	n/a
OPERATIONS FACILITIES	$129	$129	$118	$118	-8%	-8%
SUBTOTAL GENERAL SERVICES	$1,354	$1,002	$1,588	$1,009	17%	1%
TRANSPORTATION	$7,835	$7,835	$10,288	$10,288	31%	31%
WATER	$2,737	$2,737	$2,385	$2,385	-13%	-13%
WASTEWATER	$1,362	$1,362	$5,595	$5,595	311%	311%
SUBTOTAL ENGINEERING SERVICES	$11,934	$11,934	$18,268	$18,268	53%	53%
TOTAL DEVELOPMENT CHARGE	**$13,288**	**$12,936**	**$19,856**	**$19,278**	**49%**	**49%**

1. sdu = single detached unit
2. Regional Library charge only levied in Townships.
3. Current 'General Government' charge includes charges for Police, Administration Debt, Watershed Studies, and Planning Studies.
4. Transit charge only levied in urban areas.

Note: Totals may not add due to rounding.

TABLE 10

REGION OF WATERLOO
2014 DEVELOPMENT CHARGES STUDY
COMPARISION OF CURRENT AND CALCULATED DEVELOPMENT CHARGES

	Non-Residential Development Charge					
	Current Charge (1 Jan 2014) ($/ft^2)		Calculated Charge ($/ft^2)		% Difference	
Service	**Urban Areas**	**Township**	**Urban Areas**	**Township**	**Urban Areas**	**Township**
REGIONAL LIBRARY[2]	$0.00	$0.00	$0.00	$0.00	0%	0%
GENERAL GOVERNMENT[3]	$0.28	$0.28	$0.20	$0.20	-27%	-27%
Waterloo Regional Police			*$0.14*	*$0.14*		
General Government			*$0.06*	*$0.06*		
EMERGENCY MEDICAL SERVICES	$0.04	$0.04	$0.05	$0.05	30%	30%
AIRPORT	$0.24	$0.24	$0.28	$0.28	18%	18%
TRANSIT[4]	$0.36	$0.00	$0.44	$0.00	22%	0%
OPERATIONS FACILITIES	$0.08	$0.08	$0.07	$0.07	-15%	-15%
SUBTOTAL GENERAL SERVICES	$1.00	$0.64	$1.05	$0.61	5%	-5%
TRANSPORTATION	$4.89	$4.89	$5.71	$5.71	17%	17%
WATER	$2.46	$2.46	$1.23	$1.23	-50%	-50%
WASTEWATER	$1.24	$1.24	$2.86	$2.86	131%	131%
SUBTOTAL ENGINEERING SERVICES	$8.59	$8.59	$9.80	$9.80	14%	14%
TOTAL DEVELOPMENT CHARGE	**$9.59**	**$9.23**	**$10.84**	**$10.41**	**13%**	**13%**

3. Current 'General Government' charge includes charges for Police, Administration Debt, Watershed Studies, and Planning Studies.
4. Transit charge only levied in urban areas.

Note: Totals may not add due to rounding.

APPENDIX A

DEVELOPMENT FORECAST

APPENDIX A

DEVELOPMENT FORECAST

This appendix provides details of the development forecast used to prepare the 2014 Development Charges Background Study for the Region of Waterloo. The forecast method and key assumptions are discussed. The forecast results are presented in the following tables:

Table A Historical Development

- A.1 Population
- A.2 Households and Housing
- A.3 Employment and Non-Residential Floorspace

Table B Forecast Development

- B.1 Population, Households and Housing
- B.2 Employment and Non-Residential Floorspace

A. FORECAST APPROACH, KEY ASSUMPTIONS AND DEFINITIONS

The *Development Charges Act (DCA)* requires the Region to estimate "the anticipated amount, type and location of development" for which development charges may be imposed. The development forecast must cover both residential and non-residential development and be specific enough with regards to quantum, type, location and timing of development to allow the Region to prepare a reasonable development-related capital program. A ten-year development forecast, from 2014 to 2023, has been used for all the development charge eligible services in the Region.

The development forecast is based on forecasts of development occurring within the Region's approved development areas. This is consistent with Provincial regulations that require development charge forecasts be based on areas approved for development in a municipality's official plan.

The forecasts are premised on the Region achieving population and employment targets established by Table 1 of the Council approved Regional Official Plan (for 2029) which are consistent with population and employment forecasts for the Region under the Provincial *Growth Plan for the Greater Golden Horseshoe* (for 2031).[1]

It is noted that the Regional Official Plan, approved by Council June 16, 2009, is at the time of writing under appeal in its entirety at the Ontario Municipal Board (OMB). Should a future OMB or other court ruling, or the Region's own long-term growth projections, significantly alter the assumptions used for the development forecasts in this study it is recommended that the Region update its development charges at an appropriate time to reflect the changes.

Development charges calculations in this study are based on master servicing plans and other capital development plans that are themselves based on the development forecasts shown here.

- For the general services and transportation service, development charges are based on Region-wide forecasts. The Region-wide forecasts have been allocated to urban areas (collectively the Cities of Kitchener, Cambridge, and Waterloo) and rural areas (collectively the Townships of Wellesley, Wilmot, Woolwich and North Dumfries) for the purposes of calculating the charges for transit and Regional library services respectively.

- The transportation service development-related capital program is based on population and employment forecasts that were prepared for the *Regional Transportation Master Plan* (2009) (RTMP). The RTMP forecasts are consistent with the development charges forecasts presented in this report.

- Capital planning and development charges for the water and wastewater services are based on service area population forecasts prepared by the Region and published in its *Water and Wastewater Monitoring Report* (2013). The service area forecasts are also consistent with the development forecasts presented here and are summarized separately in Appendix D.

[1] That is, 2029 population and employment targets of 712,000 and 359,000 and 2031 population and employment targets of 729,000 and 366,000.

The development forecasts are based on a range of data including Statistics Canada Census data, Canada Mortgage Housing Corporation (CMHC) housing market information, *Labour Force Survey* data, local municipal building permits and development application data. Studies of student populations were also used to establish a forecast of post secondary students and student housing.

While the forecasts are consistent with the Regional Official Plan and the *Growth Plan*, the definition of population used for the purposes of the development charges study incorporates:

- The population recorded in the Census ("Census population"). This definition does not include the Census net under-coverage (about 4% of the Census population) which represents those who were missed by the Census, and which is included in the definition of population used in the Regional Official Plan and the *Growth Plan*.

- An estimate of full-time post-secondary students who reside in off-campus housing but whose permanent residence is outside the Region. This student population is not counted by the Census. Full-time students are included in all population figures in this study because the need for municipal services is in part driven by development triggered by student growth.

Population figures shown in the development forecast represent mid-year estimates, with the exception of students which are based on fall term enrollment figures. Unit figures represent "occupied units", and are associated with the year in which they are anticipated to be occupied.

The "Total Census Employment" figures presented represent Statistics Canada place of work data. Place of work data record where people work rather than their place of residence. Employment is categorized as industrial, commercial, institutional, and other. The latter category includes work-at-home, no fixed workplace, and agriculture, and for the purposes of the development charge calculations, is considered not to require building floorspace for its activities.

B. HISTORICAL DEVELOPMENT IN THE REGION

Prior to 2009, the Region of Waterloo had experienced steady and sustained population, household and employment growth for many years. The growth was fuelled by a strong and diverse local economy and high levels of in-migration. Generally, employment growth and construction activity in the non-residential sector has been steady since 2001. *Labour Force Survey* data indicate that, as elsewhere in the Province, the recent (2008-2009) recession resulted in some job losses, particularly in the manufacturing sector.

1. Historical Residential Development

Historical population and housing figures presented in Tables A.1 and A.2 are derived from Statistics Canada Census data. For development charges purposes, a ten-year historical period of 2004 to 2013 is used for calculating service levels. Since 2011 was the year of the last Census, figures for 2012 and 2013 are estimated based on building permit activity and vacancy rate estimates.

Table A.1 shows that population growth across the Region remained steady between 1.3% and 2.1% per annum over the historical period to 2008. Growth fell to under 1.0% per annum during 2008 and 2009, with much of the slowdown occurring in the Cities, but appears to have rebounded to almost pre-recessionary levels in recent years.

The number of housing units in the Region has grown at a slightly higher rate than the population over the same period. As with the population, the rate of housing growth fell during the recessionary period but has started to recover (see Table A.2). The rate of growth in off-campus student housing, a substantial component of development in the Cities, has been higher than the overall rate of housing growth in recent years.

The overall market share of new single and semi-detached units has fallen in recent years, to a low of 43% of total construction in 2013. Growth in apartment housing has been particularly strong in recent years: in 2012 and 2013 44% of all newly constructed units in the Region were apartments (see Table A.2).

2. Historical Non-Residential Development

Historical employment and non-residential building floorspace in the Region is presented in Table A.3. Drawing on Statistics Canada's *Labour Force Survey* information, Table A.3 shows that employment growth, which had been relatively steady prior to 2008, fell during the recession but has since risen. The net increase in employment in the ten-year period 2004 to 2013 is estimated at 48,580, with the

majority of growth (34,080) occurring in the commercial sector and the industrial sector being the only sector exhibiting decline (-2,390).

The net increase in floorspace over the same ten-year period was 2.2 million m^2, with the majority of growth (1.1 million m^2) being in commercial buildings. The net change in industrial floorspace (497,600 m^2) is in contrast to the decline in industrial employment over the period; a reflection of declining employment densities in existing buildings through vacancy, under-utilization, shift reductions, and capital-labour substitution.

C. FORECAST METHOD AND RESULTS

This section describes the method used to establish the ten-year development charges forecast for the period 2014 to 2023.

Development charges are levied on residential development as a charge per new unit. Therefore, for the residential forecast, a projection of both the *population growth*[2] as well as the *population in new housing units* is required.

- The *population growth* determines the need for additional facilities and provides the foundation for the development-related capital program.

- When calculating the development charge, however, the development-related net capital costs are spread over the total additional population that occupy new housing units. This *population in new units* represents the population from which development charges will be collected.

Development charges are levied on non-residential development as a charge per unit of gross floor area (GFA). As with the residential forecast, the non-residential forecast requires both a projection of *employment growth* as well as a projection of the *employment growth associated with new floorspace* in the Region.

1. Residential Development Forecast

The residential development forecast incorporates forecasts of population, households, and housing units by type. The population forecast is Census based and is anchored on the 2031 population forecast of 729,000 for the Region, established by the *Growth Plan*. Population to be housed in 'collective' dwellings (e.g. nursing homes) is forecast separately as this population is expected to grow more rapidly over the forecast period

[2] Commonly referred to as "net population growth" in the context of development charges.

than the population in households due to aging of the population. The population forecast also gives consideration to post-secondary students that are not counted by the Census. In effect, the development charge population forecast is the sum of three independent forecasts of: household population, population in collectives, and students.

Table B.1 summarizes the population and household forecast for the Region, Cities and Townships between 2014 and 2023. The Region is forecast to grow by 100,035 persons and 43,789 households over the period. The higher rate of household growth compared to population growth is predicated on a slight decline in occupancy levels in existing housing units and a continuing shift to multi-residential development that typically has lower persons per unit (ppu).

The residential development charges calculation is based on a forecast of population growth in new housing units. Projections of housing by type are consistent with the amount, type and location of development planned for under the recently approved Regional Official Plan for the period 2014 to 2023. In general, residential unit growth is forecast to shift towards higher density housing. This is in keeping with recent shifts in unit type preference in the Region and Regional Official Plan policies aimed at achieving *Growth Plan* intensification targets and increased densities in greenfields.

The housing unit forecast is also shown in Table B.1. Population growth in new units is estimated by applying the following ppu to the housing unit forecast: 3.25 for single and semi-detached units; 2.44 for rows and other multiples; 1.77 for apartments; and 3.95 for off-campus student accommodation. The ppu estimates are based upon the occupancy patterns of similar unit types constructed in the Region between 1986 and 2006 and are consistent with those used in the preparation of the Regional Official Plan. The total ten-year population growth in new units is forecast at 105,151 for the Region, 88,165 for the Cities, and 16,986 for the Townships.

The difference between the forecast population growth in new units in the Region (105,151) and the population growth (100,035) represents the declining population in existing 2013 dwellings (-5,116) over the next ten years.

2. Non-Residential Development Forecast

The employment forecast is anchored on the 2031 employment forecast of 366,000 for the Region established by the *Growth Plan*. Table B.2 shows that total Census employment (or "net" employment) is forecast to grow by 41,010 over the ten-year forecast period with the majority of growth being in the commercial (16,590 or 40%) and institutional (12,500 or 30%) sectors. Industrial employment is anticipated to reverse its recent decline and grow by 2,670 over the period (7% of total employment).

Non-residential development charges are calculated on a unit of gross floor area (GFA) basis. Therefore, a forecast of new non-residential building space has been developed. As with the residential forecast, the floorspace forecast covers the ten-year period from 2014 to 2023 for all services.

The floorspace forecast for industrial, commercial and institutional uses is based on historical floorspace trends and averages. The forecast also accounts for known or expected developments in the near- to medium-term as well as the long-term outlook for employment envisioned by the Regional Official Plan and *Growth Plan*.

An assumed floorspace per worker (FSW) for each employment category is then applied to the new floorspace forecast in order to estimate the number of associated employees. The following FSW assumptions have been used:

Industrial	80 m^2 per employee
Commercial	42 m^2 per employee
Institutional	50 m^2 per employee

These factors are consistent with those used by the Cities of Kitchener and Waterloo in their most recent development charges background studies as well as the Region's 2009 development charges background study.

The floorspace forecasts are provided in Table B.2. The total floorspace growth is forecast at 2,366,537 m^2 over the ten-year period of which the largest component relates to commercial development (899,674 m^2 or 38%) followed by institutional development (825,493 m^2 or 35%) and industrial development (641,370 m^2 or 27%). A significant amount of new industrial floorspace is anticipated to be generated by the development of some of the East Side Lands within the ten-year period.

The proportion of employment and floorspace growth in the Townships and the Cities is determined based on information from a range of sources, including recent building permits, plans of subdivision, and land capacity estimates (see Table B.2).

It is noted that the decline in existing industrial floorspace through demolitions, obsolescence, less intensive use, and shift reductions is expected to continue to be substantial. When taken together with the declining trend in new industrial construction, the net increase in floorspace and employment in this sector is forecast to be very small.

REGION OF WATERLOO DEVELOPMENT CHARGE STUDY - 2014

TABLE A.1
HISTORICAL POPULATION

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2004-2013
Region														
Total Population with Students	**454,345**	460,447	469,373	479,036	488,470	**497,081**	504,141	511,511	516,304	521,109	**531,705**	538,303	543,733	
- Census Population	**438,505**	444,370	453,020	462,130	471,090	**478,121**	484,825	491,840	496,435	500,450	**507,096**	513,260	518,145	
- Student Population	**15,840**	16,077	16,353	16,906	17,380	**18,960**	19,316	19,671	19,869	20,659	**24,609**	25,043	25,588	
Total Population With Students Growth		6,102	8,927	9,663	9,434	**8,611**	7,060	7,371	4,793	4,805	**10,596**	6,599	5,430	74,360
Total Population With Students Growth %		1.3%	1.9%	2.1%	2.0%	**1.8%**	1.4%	1.5%	0.9%	0.9%	**2.0%**	1.2%	1.0%	
Cities														
Total Population with Students	**403,443**	408,955	417,339	426,396	434,790	**442,447**	448,420	454,520	457,890	461,532	**470,570**	475,993	480,527	
- Census Population	**387,603**	392,878	400,986	409,490	417,410	**423,487**	429,104	434,849	438,021	440,873	**445,961**	450,950	454,939	
- Student Population	**15,840**	16,077	16,353	16,906	17,380	**18,960**	19,316	19,671	19,869	20,659	**24,609**	25,043	25,588	
Total Population With Students Growth		5,512	8,385	9,057	8,394	**7,657**	5,973	6,101	3,370	3,642	**9,038**	5,424	4,534	63,188
Total Population With Students Growth %		1.4%	2.1%	2.2%	2.0%	**1.8%**	1.3%	1.4%	0.7%	0.8%	**2.0%**	1.2%	1.0%	
Townships														
Total Population with Students	**50,902**	51,492	52,034	52,640	53,680	**54,634**	55,721	56,991	58,414	59,577	**61,135**	62,310	63,206	
- Census Population	**50,902**	51,492	52,034	52,640	53,680	**54,634**	55,721	56,991	58,414	59,577	**61,135**	62,310	63,206	
- Student Population	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	
Total Population With Students Growth		590	542	606	1,040	**954**	1,087	1,270	1,423	1,163	**1,558**	1,175	896	11,172
Total Population With Students Growth %		1.2%	1.1%	1.2%	2.0%	**1.8%**	2.0%	2.3%	2.5%	2.0%	**2.6%**	1.9%	1.4%	

Source: Statistics Canada, 2001, 2006 and 2011 Census; Statistics Canada and local municipal building permit data (for 2012 and 2013)

Note: Census population does not include an estimate of Census undercount.

Note: Student populations estimated by Region of Waterloo based on data from 3 institutions and Census custom cross-tabulation. Student figures represent estimate of full-time students less those who live in the Region (counted in the Census) plus those who leave to study elsewhere.

Note: Figures for inter-censal years are estimated.

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TABLE A.2
HISTORICAL HOUSEHOLDS AND HOUSING

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2004-2013
Region														
All Housing Units	**165,130**	167,748	171,257	175,249	179,202	**182,920**	186,047	189,397	191,748	193,825	**197,830**	200,890	203,128	
Occupied Housing Units (Census)	**161,120**	163,678	167,117	170,969	174,802	**178,120**	181,157	184,417	186,718	188,595	**191,600**	194,550	196,650	
- Singles/Semis	**103,145**	104,725	107,253	109,505	112,005	**113,725**	115,741	117,470	119,117	120,463	**122,310**	123,622	124,533	
- Rowhouses	**15,215**	15,617	16,003	16,743	17,346	**18,045**	18,327	18,968	19,389	19,672	**20,240**	20,725	21,108	
- Apartments and others	**42,760**	43,336	43,861	44,721	45,451	**46,350**	47,089	47,979	48,020	48,446	**49,045**	50,205	51,011	
Off-Campus Student Housing (Non-Census)	**4,010**	4,070	4,140	4,280	4,400	**4,800**	4,890	4,980	5,030	5,230	**6,230**	6,340	6,478	
Housing Unit Growth		2,618	3,509	3,992	3,953	**3,718**	3,127	3,350	2,351	2,077	**4,005**	3,060	2,238	31,871
Occupied Housing Units (Census)		2,558	3,439	3,852	3,833	**3,318**	3,037	3,260	2,301	1,877	**3,005**	2,950	2,100	29,533
- Singles/Semis		1,580	2,528	2,252	2,500	**1,720**	2,016	1,729	1,647	1,346	**1,847**	1,312	911	17,280
- Rowhouses		402	386	740	603	**699**	282	641	421	283	**568**	485	383	5,105
- Apartments and others		576	525	860	730	**899**	739	890	41	426	**599**	1,160	806	7,150
Off-Campus Student Housing (Non-Census)		60	70	140	120	**400**	90	90	50	200	**1,000**	110	138	2,338
Share of New Occupied Housing Units (Census)														
- Singles/Semis			74%	58%	65%	**52%**	66%	53%	72%	72%	**61%**	44%	43%	59%
- Rowhouses			11%	19%	16%	**21%**	9%	20%	18%	15%	**19%**	16%	18%	17%
- Apartments and others			15%	22%	19%	**27%**	24%	27%	2%	23%	**20%**	39%	38%	24%
Cities														
All Housing Units	**148,340**					**163,955**					**176,580**			
Occupied Housing Units (Census)	**144,330**					**159,155**					**170,350**			
Off-Campus Student Housing (Non-Census)	**4,010**					**4,800**					**6,230**			
Townships														
All Housing Units	**16,790**					**18,965**					**21,250**			
Occupied Housing Units (Census)	**16,790**					**18,965**					**21,250**			
Off-Campus Student Housing (Non-Census)	**0**					**0**					**0**			

Source: Occupied Households based on Statistics Canada, 2001, 2006, and 2011 Census. Inter- and post-Censal figures based on local municipal building permit data.

TABLE A.3
HISTORICAL EMPLOYMENT AND NON-RESIDENTIAL FLOORSPACE

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2004-2013
Region														
Total Census Employment	**230,280**	236,560	242,860	247,380	252,820	**259,310**	263,890	266,430	257,110	268,490	**276,240**	286,630	291,440	
- Industrial	**84,290**	86,290	87,620	88,850	89,290	**90,500**	89,660	87,750	79,790	82,540	**83,980**	85,070	85,230	-2,390
- Commercial	**77,260**	79,410	81,120	82,640	85,870	**89,860**	94,350	97,600	96,100	102,410	**106,680**	112,570	115,200	34,080
- Institutional	**36,040**	37,100	39,280	40,000	40,690	**40,850**	41,330	42,150	42,950	44,290	**45,550**	47,750	48,990	9,710
- Other	**32,690**	33,760	34,840	35,890	36,970	**38,100**	38,550	38,930	38,270	39,250	**40,030**	41,240	42,020	7,180
Total Census Employment Growth		6,280	6,300	4,520	5,440	**6,490**	4,580	2,540	-9,320	11,380	**7,750**	10,390	4,810	48,580
Total Census Employment Growth (%)		2.7%	2.7%	1.9%	2.2%	**2.6%**	1.8%	1.0%	-3.5%	4.4%	**2.9%**	3.8%	1.7%	
Total Occupied Floorspace (m^2)	**11,353,500**	11,779,300	12,104,900	12,330,600	12,648,500	**12,891,800**	13,168,400	13,389,400	13,651,000	13,831,300	**13,868,300**	14,123,800	14,295,000	
- Industrial	**6,166,500**	6,387,000	6,526,500	6,645,400	6,728,300	**6,827,400**	6,889,900	6,966,900	7,043,700	7,078,900	**7,002,400**	7,002,600	7,024,100	497,600
- Commercial	**3,309,200**	3,399,500	3,483,400	3,523,800	3,706,100	**3,827,900**	3,988,500	4,074,900	4,204,000	4,289,700	**4,359,700**	4,499,800	4,568,500	1,085,100
- Institutional	**1,877,800**	1,992,800	2,095,000	2,161,400	2,214,100	**2,236,500**	2,290,000	2,347,600	2,403,300	2,462,700	**2,506,200**	2,621,400	2,702,400	607,400
Total Occupied Floorspace Growth (m^2)		425,800	325,600	225,700	317,900	**243,300**	276,600	221,000	261,600	180,300	**37,000**	255,500	171,200	2,190,100
Total Occupied Floorspace Growth (%)		3.8%	2.8%	1.9%	2.6%	**1.9%**	2.1%	1.7%	2.0%	1.3%	**0.3%**	1.8%	1.2%	
Cities														
Total Census Employment	**209,687**	215,179	220,771	224,395	229,031	**234,318**	237,720	239,415	230,872	240,349	**247,019**	255,883	259,832	39,061
Total Occupied Floorspace (m^2)	**10,011,359**	10,375,477	10,676,249	10,855,849	11,133,411	**11,324,684**	11,551,615	11,728,012	11,944,599	12,081,141	**12,108,299**	12,320,850	12,454,002	1,777,752
Townships														
Total Census Employment	**20,593**	21,381	22,089	22,985	23,789	**24,992**	26,170	27,015	26,238	28,141	**29,221**	30,747	31,608	9,519
Total Occupired Floorspace (m^2)	**1,342,141**	1,403,823	1,428,651	1,474,751	1,515,089	**1,567,116**	1,616,785	1,661,388	1,706,401	1,750,159	**1,760,001**	1,802,950	1,840,998	412,348

Source: Statistics Canada, 2001 and 2006 Census; Labour Force Survey; local municipal non-residential building permit data.

Note. 'Other' employment category includes 'No Fixed Work Place' and 'Work at Home' employment.

REGION OF WATERLOO DEVELOPMENT CHARGE STUDY - 2014

TABLE B.1
POPULATION AND HOUSING FORECAST SUMMARY

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2014-2023
Region											
Total Population With Students	551,711	560,569	**570,638**	580,721	590,991	601,451	612,105	**622,956**	633,292	643,768	
Total Population With Students Growth	7,978	8,859	**10,068**	10,083	10,270	10,460	10,654	**10,851**	10,336	10,475	100,035
Total Population With Students Growth %	1.5%	1.6%	**1.8%**	1.8%	1.8%	1.8%	1.8%	**1.8%**	1.7%	1.7%	
Total Housing Units	206,463	210,243	**214,450**	218,920	223,485	228,149	232,913	**237,780**	242,309	246,917	43,789
Occupied Units (Census)	199,840	203,390	**207,200**	211,664	216,223	220,881	225,639	**230,500**	235,019	239,627	42,977
- Singles/Semis	125,316	126,807	**128,075**	129,544	131,027	132,524	134,036	**135,563**	136,971	138,396	13,863
- Rowhouses	21,730	22,369	**23,074**	23,900	24,746	25,610	26,494	**27,399**	28,239	29,096	7,988
- Apartments and others	52,799	54,219	**56,056**	58,224	60,456	62,751	65,113	**67,544**	69,814	72,140	21,129
Off-Campus Student Housing (Non-Census)	6,623	6,853	**7,250**	7,256	7,262	7,268	7,274	**7,280**	7,290	7,290	812
PPU in New Units											
- Singles/Semis	3.25	3.25	**3.25**	3.25	3.25	3.25	3.25	**3.25**	3.25	3.25	
- Rowhouses	2.44	2.44	**2.44**	2.44	2.44	2.44	2.44	**2.44**	2.44	2.44	
- Apartments and others	1.77	1.77	**1.77**	1.77	1.77	1.77	1.77	**1.77**	1.77	1.77	
Off-Campus Student Housing (Non-Census)	3.95	3.95	**3.95**	3.95	3.95	3.95	3.95	**3.95**	3.95	3.95	
Population Growth in New Units	7,800	9,827	**10,661**	10,652	10,856	11,064	11,276	**11,492**	10,686	10,839	105,151
- Singles/Semis	2,545	4,846	**4,121**	4,773	4,820	4,867	4,914	**4,960**	4,577	4,630	45,053
- Rowhouses	1,518	1,559	**1,720**	2,017	2,063	2,109	2,157	**2,206**	2,051	2,091	19,491
- Apartments and others	3,165	2,513	**3,252**	3,838	3,949	4,064	4,181	**4,302**	4,019	4,117	37,399
Off-Campus Student Housing (Non-Census)	573	909	**1,568**	24	24	24	24	**24**	40	0	3,207
Cities											
Total Population With Students	487,496	495,201	**504,101**	512,828	521,730	530,790	539,956	**549,331**	558,278	567,266	
Total Population With Students Growth	6,969	7,706	**8,899**	8,727	8,902	9,060	9,166	**9,375**	8,947	8,987	86,739
Total Population With Students Growth %	1.5%	1.6%	**1.8%**	1.7%	1.7%	1.7%	1.7%	**1.7%**	1.6%	1.6%	
Total Housing Unit Growth	2,898	3,307	**3,736**	3,878	3,930	4,023	4,114	**4,233**	3,922	4,003	38,043
Population Growth in New Units	6,508	8,429	**9,268**	8,902	8,976	9,169	9,354	**9,618**	8,892	9,050	88,165
Townships											
Total Population With Students	64,215	65,368	**66,537**	67,893	69,261	70,661	72,149	**73,625**	75,014	76,502	
Total Population With Students Growth	1,009	1,153	**1,169**	1,356	1,368	1,400	1,488	**1,476**	1,389	1,488	13,296
Total Population With Students Growth %	0.0%	0.0%	**0.0%**	0.0%	0.0%	0.0%	0.0%	**0.0%**	0.0%	0.0%	
Total Housing Unit Growth	437	473	**471**	592	636	641	650	**634**	607	605	5,746
Population Growth in New Units	1,292	1,398	**1,392**	1,750	1,880	1,895	1,922	**1,874**	1,794	1,789	16,986

Source: Region of Waterloo projections based on: Schedule 3, Growth Plan for the Greater Golden Horseshoe; Regional Official Plan (2010) and supporting documents; and, for 2014, building permits issued to mid-year 2013.

REGION OF WATERLOO DEVELOPMENT CHARGE STUDY - 2014

TABLE B.2

EMPLOYMENT AND NON-RESIDENTIAL FLOORSPACE FORECAST SUMMARY

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2014-2023
Region											
Total Census Employment	295,890	300,720	**304,470**	308,400	312,970	318,050	322,320	**325,470**	328,930	332,450	
- Industrial	85,230	84,920	**84,930**	85,110	85,540	86,390	87,080	**87,320**	87,600	87,900	2,670
- Commercial	117,490	120,290	**122,060**	123,710	125,590	127,480	128,870	**129,710**	130,750	131,790	16,590
- Institutional	50,260	51,710	**52,820**	54,040	55,330	56,640	57,860	**59,040**	60,260	61,490	12,500
- Other	42,910	43,800	**44,660**	45,540	46,510	47,540	48,510	**49,400**	50,320	51,270	9,250
Total Census Employment Growth	4,450	4,830	**3,750**	3,930	4,570	5,080	4,270	**3,150**	3,460	3,520	41,010
Total Census Employment Growth (%)	1.5%	1.6%	**1.2%**	1.3%	1.5%	1.6%	1.3%	**1.0%**	1.1%	1.1%	
Total Occupied Floorspace (m2)	14,475,100	14,681,700	**14,901,100**	15,116,500	15,327,500	15,545,600	15,756,400	**15,963,200**	16,168,200	16,372,100	
- Industrial	7,070,000	7,126,000	**7,196,800**	7,262,400	7,321,200	7,388,200	7,451,000	**7,511,200**	7,571,300	7,631,300	
- Commercial	4,641,000	4,728,000	**4,814,100**	4,900,800	4,986,800	5,071,900	5,157,100	**5,239,900**	5,319,900	5,398,100	
- Institutional	2,764,100	2,827,700	**2,890,200**	2,953,300	3,019,500	3,085,500	3,148,300	**3,212,100**	3,277,000	3,342,700	
- Other	0	0	**0**	0	0	0	0	**0**	0	0	
Additional Incremental Floorspace (m^2)	156,335	165,097	**207,257**	237,141	251,116	257,167	264,815	**271,036**	274,962	281,611	2,366,537
- Industrial	40,346	35,056	**48,191**	61,912	69,276	70,697	74,219	**77,616**	80,684	83,373	641,370
- Commercial	55,312	65,052	**80,247**	90,360	93,173	97,711	100,742	**103,515**	105,796	107,766	899,674
- Institutional	60,677	64,989	**78,819**	84,869	88,667	88,759	89,854	**89,905**	88,482	90,472	825,493
Floorspace per Employee (sq.m. of new construction)											
- Industrial	85	85	**85**	85	85	85	85	**85**	85	85	
- Commercial	42	42	**42**	42	42	42	42	**42**	42	42	
- Institutional	50	50	**50**	50	50	50	50	**50**	50	50	
Annual Employment Growth in New Construction	3,005	3,261	**4,054**	4,577	4,807	4,933	5,069	**5,176**	5,238	5,356	45,476
- Industrial	475	412	**567**	728	815	832	873	**913**	949	981	7,546
- Commercial	1,317	1,549	**1,911**	2,151	2,218	2,326	2,399	**2,465**	2,519	2,566	21,421
- Institutional	1,214	1,300	**1,576**	1,697	1,773	1,775	1,797	**1,798**	1,770	1,809	16,510
Cities											
Total Census Employment	263,497	267,710	**271,013**	274,520	278,615	283,179	286,964	**289,801**	292,893	296,056	36,224
Additional Incremental Floorspace (m^2)	136,164	143,785	**180,518**	206,563	218,807	224,166	230,877	**236,351**	239,841	245,723	2,062,796
Annual Employment Growth in New Construction	2,617	2,840	**3,531**	3,987	4,188	4,300	4,419	**4,514**	4,569	4,674	39,639
Townships											
Total Census Employment	32,393	33,010	**33,457**	33,880	34,355	34,871	35,356	**35,669**	36,037	36,394	4,786
Additional Incremental Floorspace (m^2)	20,171	21,312	**26,739**	30,578	32,309	33,001	33,938	**34,685**	35,121	35,888	303,741
Annual Employment Growth in New Construction	388	421	**523**	590	618	633	650	**662**	669	683	5,837

Source: Region of Waterloo projections based on: Schedule 3, Growth Plan for the Greater Golden Horseshoe; Regional Official Plan (2010) and supporting documents; and, for 2014, building permits issued to mid-year 2013.

APPENDIX B

GENERAL SERVICES TECHNICAL APPENDIX

APPENDIX B

GENERAL SERVICES TECHNICAL APPENDIX
INTRODUCTION AND OVERVIEW

This appendix provides the detailed analysis undertaken to establish the development charge rates for each of the general services in the Region of Waterloo.

The appendix is divided into seven sub-sections, with one section for each of the general services:

- B.1 Regional Library
- B.2 Waterloo Regional Police Service
- B.3 Emergency Medical Services
- B.4 Airport
- B.5 Transit
- B.6 General Government
- B.7 Operations/Facilities

Every sub-section, with the exception of General Government, contains a set of three tables. The tables provide the background data and analysis undertaken to arrive at the calculated development charge rates for that particular service. An overview of the content and purpose of each of the tables is given below.

TABLE 1 HISTORICAL SERVICE LEVELS

Table 1 presents the data used to determine the ten year historic service level. The *Development Charges Act* (*DCA*) and *Ontario Regulation 82/98* require that development charges be set at a level no higher than the average service level provided in the Region over the ten year period immediately preceding the preparation of the background study, on a service by service basis. For the purpose of this study, the historic inventory period has been defined as 2004 to 2013.

O. Reg. 82/98 requires that when defining and determining historical service levels both the quantity and quality of service be taken into consideration. In most cases, the service levels are initially established in quantitative terms. For example, service levels

for buildings are presented in terms of square feet per unit. The qualitative aspect is introduced by considering the monetary value of the facility or service. In the case of buildings, for example, the cost would be shown in terms of dollars per square foot to replace or construct a facility of the same quality. This approach helps to ensure that the capital facilities that are to be charged to new development reflect not only the quantity (number and size) but also the quality (value or cost) of service provided by the Region in the past. Both the quantitative and qualitative aspects of service levels used in the current analysis are based on information provided by Regional staff. This information is generally based on historical records and experience with costs to acquire or construct similar facilities, equipment and infrastructure.

The final page of Table 1 shows the calculation of the "maximum allowable funding envelope", net of uncommitted excess capacity. The maximum allowable is defined as the ten year historical service level (expressed as either $/capita or $/capita and employment) multiplied by the forecast increase in net population or net population and net employment over the planning period. The resulting figure is the value of capital infrastructure that must be constructed for that particular service so that the ten year historical service level is maintained.

There is also a requirement in the *DCA* to consider "excess capacity" within the Region's existing infrastructure that may be available to partially meet future servicing requirements. If Council has expressed its intent, before or at the time the capacity was created, to recoup the cost of providing the capacity from new development, it is considered "committed excess capacity" under the *DCA* and the associated capital is eligible for recovery. Should uncommitted excess capacity exist it will be determined whether or not this capacity will be available to service new development and, if so, appropriate adjustments will be made to the calculations.

TABLE 2 2014 – 2023 DEVELOPMENT-RELATED CAPITAL PROGRAM & CALCULATION OF THE UNADJUSTED DEVELOPMENT CHARGE

The *DCA* requires that Council express its intent to provide future capital facilities to support future growth. Based on the development forecasts presented in Appendix A, a development-related capital program which sets out the projects required to service anticipated development for the ten-year period from 2014 to 2023 has been developed.

To determine the share of the program that is eligible for recovery through development charges, the gross project costs are reduced by any anticipated grants or subsidies, "benefit to existing" shares, and the mandatory 10% reduction for all services except protection services and engineered services.

A benefit to existing share represents that portion of a capital project that will benefit the existing community. It could, for example, represent a portion of a new facility that, at least in part, replaces a facility that is demolished, redeployed or will otherwise not be available to serve its former function (a "replacement" share). The benefit to existing share of the capital program is not deemed to be development-related and is therefore removed from the development charge calculation. The capital cost for benefit to existing shares will require funding from non-development charge sources, typically property taxes or user fees.

When calculating development charges, the development-related net capital cost must be reduced by 10% for all services except protection services and engineered services (*DCA* s.5.(1)8.). The 10% discount is therefore applied to all general services considered in this appendix with the exception of the Waterloo Regional Police Service and Operations/Facilities services. As with benefit to existing shares, the 10% mandatory reduction must be funded from non-development charge sources.

The capital program less any benefit to existing shares and the 10% reduction, yields the development-related costs. Although deemed development-related, not all of the net development-related capital program may be recoverable from development charges in the period from 2014 to 2023. For some of the services, a portion of the capital program will service development that will not occur until after 2023. This portion of the capital program is either deemed "pre-built" service capacity to be considered as committed excess capacity to be recovered under future development or represents a future service level increase that is ineligible for development charge recovery.

The remaining portion of the net capital program represents the development-related cost that may be included in the development charge calculation. In all cases this amount is equal to or less than the maximum allowable funding envelope that is calculated on the final page of Table 1. The result is the discounted development-related net capital cost that is eligible for recovery through development charges over the period from 2014 to 2023.

Calculation of the Unadjusted Development Charge Rates

The section below the capital program displays the calculation of the "unadjusted" development charge rates. The term "unadjusted" development charge is used to distinguish the charge that is calculated prior to cash flow financing considerations. The cash flow analysis is shown in Table 3.

The first step when determining the unadjusted development charge rate is to allocate the development-related net capital cost between the residential and non-residential sectors. For all general services except the Regional Library and Transit the development-related costs have been allocated 69% residential and 31% non-residential. This ratio is based on forecast changes in population in new housing units and employment in new non-residential floor space over the planning period.

The development-related costs associated with the Regional Library have been allocated 100% to residential development because the need for this service is driven entirely by the residential sector. The development-related costs associated with Transit have been allocated 71% residential and 29% non-residential. The Transit ratio is based on development forecasts for the urban areas of the Region that are served by Transit services.

The residential share of the 2014-2023 development charge eligible costs are then divided by the forecast population growth in new units. This gives the unadjusted residential development charge per capita. The non-residential development-related net capital costs are divided by the forecast increase in non-residential gross floor area (GFA). This yields a charge per square foot of new non-residential GFA.

TABLE 3 CASH FLOW ANALYSIS

A cash flow analysis is also undertaken to account for the timing of projects and receipt of development charges. Interest earnings or borrowing costs are, therefore, accounted for in the calculation as allowed under the *DCA*. Based on the development forecast, the analysis calculates the development charges rate that is required to finance the net development-related capital spending plan including provisions for any borrowing costs or interest earnings on the reserve funds. The cash flow analysis is designed so that the closing cash balance at the end of the planning period is as close to nil as possible.

Opening cash balances in the cash flow analysis reflect the reserve fund balances that are available to fund development-related capital works as at 31 December, 2013. A summary of the reserve fund balances, as well as projected reserve fund balances over the 10-year planning period for each service, is shown in Appendix E.

In order to determine appropriate development charges rates reflecting borrowing and earnings necessary to support the net development-related funding requirement, assumptions are used for the inflation rate and interest rate. An inflation rate of 2.0% is used for the funding requirements, and interest rates of 5.5% (negative balance) and 3.5% (positive balance) are used for borrowing/earnings on the funds. This yields effective real discount rates of 3.5% and 1.5% respectively.

Table 3 displays the results of the cash flow analysis and provides the adjusted or final per capita residential and per square foot (of GFA) non-residential development charges.

APPENDIX B.1

REGIONAL LIBRARY

APPENDIX B.1

REGIONAL LIBRARY

The Waterloo Regional Library provides library services to the Region's Townships (Wilmot, Wellesley, Woolwich, and North Dumfries). For the purpose of calculating a development charge for the service only the population in the Townships is considered.

TABLE 1 2004-2013 HISTORICAL SERVICE LEVELS

Table 1 (page 1) displays the Regional Library's ten year historical inventory for buildings, land, and furniture and equipment (excluding personal computers). The building area totals 24,711 ft^2 and has a current replacement value of $7.2 million. The land associated with the buildings totals 0.34 hectares and is valued at $255,000. The buildings contain materials, furniture, and equipment (including 39 public access terminals) valued at $7.3 million.

The 2013 full replacement value of the inventory of capital assets for the Regional Library is $14.9 million and the ten year historical average service level is $226.98 per capita (page 2). The historical service level, multiplied by the ten year forecast Township net population growth, results in a ten year maximum allowable $3.0 million that can be considered for recovery from development charges.

Recent investment in collection materials has resulted in an excess capacity of service. This excess capacity is estimated at $563,738 and must be netted off the maximum allowable. Finally, Regional Library capital costs must be reduced by ten per cent as per the *DCA*. The resulting net maximum allowable funding envelope brought forward to the development charges calculation is reduced to $2.2 million.

TABLE 2 2014 – 2023 DEVELOPMENT-RELATED CAPITAL PROGRAM & CALCULATION OF UNADJUSTED DEVELOPMENT CHARGE

There are no plans to expand the capital facilities associated with providing Regional Library infrastructure over the next ten years. However, the Region expects to add $1.3 million worth of development-related library materials, furniture, and equipment over the 2014 - 2023 planning period in order to maintain historical service levels.

This $1.3 million becomes subject to the ten per cent reduction imposed by the *DCA*. The discounted development-related net capital cost of $1.2 million is carried forward to the development charge calculation.

As shown on Table 2, the entire discounted development-related net capital cost for the Regional Library is allocated against residential development in the Townships. This results in an unadjusted development charge of $68.88 per capita.

TABLE 3 CASH FLOW AND RESERVE FUND ANALYSIS

The cash flow analysis is displayed in Table 3. It considers the timing of the projects as well as the timing of the development charge revenues to adjust the calculated rates. After cash flow consideration, the residential calculated charge decreases slightly to $64.60 per capita.

The following table summarizes the calculation of the Regional Library development charge:

REGIONAL LIBRARY						
10-year Hist. Service Level	2014 - 2023 Development Related Capital Program		Unadjusted Development Charge		**Adjusted Development Charge**	
$/capita	Total	Net DC Recoverable	$/capita	$/m^2	**$/capita**	**$/m^2**
$226.98	$1,300,000	$1,170,000	$68.88	$0.00	**$64.60**	**$0.00**

APPENDIX B.1
TABLE 1 - PAGE 1

REGION OF WATERLOO
INVENTORY OF CAPITAL ASSETS
REGIONAL LIBRARY

BUILDINGS	# of Square Feet										UNIT COST
Branch Name	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	($/sq. ft.)
Total Branch Library Floorspace	24,711	24,711	24,711	24,711	24,711	24,711	24,711	24,711	24,711	24,711	$290
Total (sq.ft.)	**24,711**	**24,711**	**24,711**	**24,711**	**24,711**	**24,711**	**24,711**	**24,711**	**24,711**	**24,711**	
Total ($000)	**$7,166.2**	**$7,166.2**	**$7,166.2**	**$7,166.2**	**$7,166.2**	**$7,166.2**	**$7,166.2**	**$7,166.2**	**$7,166.2**	**$7,166.2**	

LAND	# of Hectares										UNIT COST
Branch Name	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	($/ha)
Total Branch Library Land	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	$740,000
Total (ha)	**0.34**	**0.34**	**0.34**	**0.34**	**0.34**	**0.34**	**0.34**	**0.34**	**0.34**	**0.34**	
Total ($000)	**$254.8**	**$254.8**	**$254.8**	**$254.8**	**$254.8**	**$254.8**	**$254.8**	**$254.8**	**$254.8**	**$254.8**	

COLLECTION MATERIALS, FURNITURE & EQUIPMENT	# of Terminals / $ of Furniture and Collection Materials										UNIT COST
Type of Collection (excluding computers)	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	($/item)
Public Access Terminals	30	30	30	30	30	38	38	38	39	39	$1,500
Collection Materials, Furniture & Equipment	$4,449,029	$5,435,906	$5,111,217	$4,932,504	$4,782,648	$5,038,375	$5,294,103	$6,861,596	$7,249,492	$7,430,729	
Total (#)	**30**	**30**	**30**	**30**	**30**	**38**	**38**	**38**	**39**	**39**	
Total ($000)	**$4,494.0**	**$5,480.9**	**$5,156.2**	**$4,977.5**	**$4,827.6**	**$5,095.4**	**$5,351.1**	**$6,918.6**	**$7,308.0**	**$7,489.2**	

APPENDIX B.1
TABLE 1 - PAGE 2

REGION OF WATERLOO
CALCULATION OF SERVICE LEVELS
REGIONAL LIBRARY

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	
Historic Population (Townships)	52,640	53,680	54,634	55,721	56,991	58,414	59,577	61,135	62,310	63,206	**= (F)**

INVENTORY SUMMARY($000)

Buildings	$7,166.2	$7,166.2	$7,166.2	$7,166.2	$7,166.2	$7,166.2	$7,166.2	$7,166.2	$7,166.2	$7,166.2	
Land	$254.8	$254.8	$254.8	$254.8	$254.8	$254.8	$254.8	$254.8	$254.8	$254.8	
Collection Materials, Furniture & Equipment	$4,494.0	$5,480.9	$5,156.2	$4,977.5	$4,827.6	$5,095.4	$5,351.1	$6,918.6	$7,308.0	$7,489.2	
Total ($000)	**$11,915.0**	**$12,901.9**	**$12,577.2**	**$12,398.5**	**$12,248.7**	**$12,516.4**	**$12,772.1**	**$14,339.6**	**$14,729.0**	**$14,910.2**	**= (D)**

SERVICE LEVEL ($/capita)

											10 Year Average Service Level
Buildings	$136.14	$133.50	$131.17	$128.61	$125.74	$122.68	$120.28	$117.22	$115.01	$113.38	$124.37
Land	$4.84	$4.75	$4.66	$4.57	$4.47	$4.36	$4.28	$4.17	$4.09	$4.03	$4.42
Collection Materials, Furniture & Equipment	$85.37	$102.10	$94.38	$89.33	$84.71	$87.23	$89.82	$113.17	$117.28	$118.49	$98.19
Total ($/capita)	**$226.35**	**$240.35**	**$230.21**	**$222.51**	**$214.92**	**$214.27**	**$214.38**	**$234.56**	**$236.38**	**$235.90**	**$226.98**
											= (A)

REGION OF WATERLOO
CALCULATION OF MAXIMUM ALLOWABLE DC
REGIONAL LIBRARY

10-Year Funding Envelope Calculation		
10 Year Average Service Level 2004 - 2013	$ 226.98	(A)
Net Population Growth in Townships 2014 - 2023	13,296	(B)
Maximum Allowable Funding Envelope	$ 3,017,926	(C) = (A) x (B)
Less: Uncommitted Excess Capacity	$ 563,738	(H)
Less: 10% Legislated Reduction	$ 245,419	(I) = ((C) - (H)) * 10%
Discounted Maximum Allowable Funding Envelope	**$ 2,208,769**	(J) = (C) - (H) - (I)

Excess Capacity Calculation ($000)

2013 Inventory	$ 14,910.2	(D)
Using Average Service Level	$ 14,346.5	(E) = (A) * (F) / 1000
Committed Excess Capacity	$ -	(G) (see Appendix E)
Uncommitted Excess Capacity	$ 563.7	(H) = greater of (D) - (E) - (G) or '0'

APPENDIX B.1
TABLE 2 - PAGE 1

REGION OF WATERLOO
2014 DEVELOPMENT CHARGES STUDY
DEVELOPMENT-RELATED CAPITAL PROGRAM

Project #	Project Description	Timing	(C) Total Project Cost	(D) Less Grants/ Subsidies/ Recoveries	(E) = (C) - (D) Net Cost	(F) Replacement and Benefit to Existing Share	(G) = (E) - (F) * 10% 10% Reduction	(H) = (E) - (F) - (G) Total Development-Related Costs	(I) = (H) up to sum of (B) Development-Related Costs 2014-2023	(J) = (I) - (H) Development-Related Costs Post 2023 or Service Level Increase	(K) = (I) + (J) Development-Related Costs Total
	1.00 REGIONAL LIBRARY										
	1.1 No Buildings or Land										
	1.2 Material and Furnishings Acquisitions										
20002	1.2.1 Library Materials, Furnishings & Equipment	2014	$ 130,000	$ -	$ 130,000	$ -	$ 13,000	$ 117,000	$ 117,000	$ -	$ 117,000
20002	1.2.2 Library Materials, Furnishings & Equipment	2015	$ 130,000	$ -	$ 130,000	$ -	$ 13,000	$ 117,000	$ 117,000	$ -	$ 117,000
20002	1.2.3 Library Materials, Furnishings & Equipment	2016	$ 130,000	$ -	$ 130,000	$ -	$ 13,000	$ 117,000	$ 117,000	$ -	$ 117,000
20002	1.2.4 Library Materials, Furnishings & Equipment	2017	$ 130,000	$ -	$ 130,000	$ -	$ 13,000	$ 117,000	$ 117,000	$ -	$ 117,000
20002	1.2.5 Library Materials, Furnishings & Equipment	2018	$ 130,000	$ -	$ 130,000	$ -	$ 13,000	$ 117,000	$ 117,000	$ -	$ 117,000
20002	1.2.6 Library Materials, Furnishings & Equipment	2019	$ 130,000	$ -	$ 130,000	$ -	$ 13,000	$ 117,000	$ 117,000	$ -	$ 117,000
20002	1.2.7 Library Materials, Furnishings & Equipment	2020	$ 130,000	$ -	$ 130,000	$ -	$ 13,000	$ 117,000	$ 117,000	$ -	$ 117,000
20002	1.2.8 Library Materials, Furnishings & Equipment	2021	$ 130,000	$ -	$ 130,000	$ -	$ 13,000	$ 117,000	$ 117,000	$ -	$ 117,000
20002	1.2.9 Library Materials, Furnishings & Equipment	2022	$ 130,000	$ -	$ 130,000	$ -	$ 13,000	$ 117,000	$ 117,000	$ -	$ 117,000
20002	1.2.10 Library Materials, Furnishings & Equipmen	2023	$ 130,000	$ -	$ 130,000	$ -	$ 13,000	$ 117,000	$ 117,000	$ -	$ 117,000
	Sub-total Material and Furnishings Acquisitions		$ 1,300,000	$ -	$ 1,300,000	$ -	$ 130,000	$ 1,170,000	$ 1,170,000	$ -	$ 1,170,000
	TOTAL REGIONAL LIBRARY		**$ 1,300,000**	**$ -**	**$ 1,300,000**	**$ -**	**$ 130,000**	**$ 1,170,000**	**$ 1,170,000** Lesser of (B) or (H)	**$ -**	**$ 1,170,000**

Residential Development Charge Calculation		
Residential Share of 2014-2023 Discounted Development-Related Capital Program	100%	$1,170,000
10 Year Growth in Population in New Units		16,986
Unadjusted Development Charge Per Capita ($)		**$68.88**
Non-Residential Development Charge Calculation		
Non-Residential Share of 2014-2023 Discounted Development-Related Capital Program	0%	$ -
10 Year Growth in Square Meters		
Unadjusted Development Charge Per m^2 ($)		**$0.00**

(A) 2013 - 2023 Discounted Funding Envelope = (J) on previous page	$ 2,208,769
Reserve Fund Balance as at Dec 31, 2013	$ 75,469
(B) Adjusted 2014 - 2013 Funding Envelope	$ 2,208,769

APPENDIX B.1
TABLE 3

REGION OF WATERLOO
CASHFLOW AND DETERMINATION OF DEVELOPMENT CHARGE
REGIONAL LIBRARY
RESIDENTIAL DEVELOPMENT CHARGE

1.00 REGIONAL LIBRARY

OPENING CASH BALANCE FROM APPLICABLE RESERVES	$75,469			**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**TOTAL**
OPENING CASH BALANCE ($000)				$75.5	$43.7	$17.3	($11.0)	($16.4)	($12.4)	($7.6)	$0.2	$5.0	$3.8	
2014-2023 RESIDENTIAL FUNDING REQUIREMENTS														
1.00 REGIONAL LIBRARY - current ($000) (1)				$117.0	$119.3	$121.7	$124.2	$126.6	$129.2	$131.8	$134.4	$137.1	$139.8	**$1,281.1**
REVENUE - current ($000)	Rate for 2014													
- Dev. Charge Receipts (2)	$64.60	Inflation:	2.0%	$83.5	$92.1	$93.6	$120.0	$131.5	$135.2	$139.8	$139.1	$135.8	$138.1	**$1,208.7**
	Balance:	Positive	Negative											
- Interest on Opening Balance	Rate:	3.5%	5.5%	$2.6	$1.5	$0.6	($0.6)	($0.9)	($0.7)	($0.4)	$0.0	$0.2	$0.1	**$2.5**
- Interest on In-year Transactions (excl.int.)	Rate:	3.5%	5.5%	($0.9)	($0.7)	($0.8)	($0.6)	$0.1	$0.1	$0.1	$0.1	($0.0)	($0.0)	**($2.7)**
						$0.0	$0.0							
TOTAL REVENUE ($000)				$85.2	$92.9	$93.4	$118.8	$130.7	$133.9	$139.5	$139.2	$135.9	$138.2	**$1,207.8**
CLOSING CASH BALANCE ($000)				$43.7	$17.3	($11.0)	($16.4)	($12.4)	($7.6)	$0.2	$5.0	$3.8	$2.2	
REGIONAL LIBRARY PER CAPITA CHARGE	**$64.60**													
(1) Based on residential funding requirements in constant $000 of				*$117.0*	*$117.0*	*$117.0*	*$117.0*	*$117.0*	*$117.0*	*$117.0*	*$117.0*	*$117.0*	*$117.0*	***$1,170.0***
(2) Based on population growth in new units of				*1,292*	*1,398*	*1,392*	*1,750*	*1,880*	*1,895*	*1,922*	*1,874*	*1,794*	*1,789*	***16,986***

APPENDIX B.2

WATERLOO REGIONAL POLICE SERVICE

APPENDIX B.2

WATERLOO REGIONAL POLICE SERVICE

The Waterloo Regional Police Service is responsible for the provision of police protection services across the entire Region.

TABLE 1 2004-2013 HISTORICAL SERVICE LEVELS

The Police ten year historical inventory of capital assets includes a headquarters, six divisional stations, a police reporting centre, a firearms training facility, and an investigative services unit (page 1). The latter came into use in 2008 but has been oversized to accommodate future expansions. The combined area of the buildings, excluding the oversized portion of the investigative services building, is 367,463 sq.ft., and the buildings are valued at $102.1 million. The land area associated with the buildings is 22 hectares and is valued at $17.0 million. Police vehicles add another $10.6 million to the value of the inventory. Finally, personal police equipment, office furniture, equipment, and software, and specialized equipment add another $14.4 million to the value of the inventory (page 2).

The current replacement value of the Police capital infrastructure is $144.1 million. It has provided the Region with a ten year average service level of $157.73 per capita and employment (page 3). This service level, when multiplied by the ten year growth in net population and employment, results in a ten year maximum allowable funding envelope of $22.2 million.

Recent facility construction has resulted in an excess capacity of service. The uncommitted portion of this excess capacity is valued at $5.6 million and must be netted off the maximum allowable. The remaining $16.6 million, being exempt from the mandatory 10% capital cost reduction, can be considered for recovery through development charges.

TABLE 2 2014 – 2023 DEVELOPMENT-RELATED CAPITAL PROGRAM & CALCULATION OF UNADJUSTED DEVELOPMENT CHARGE

The development-related capital program for Police includes five construction projects: the remaining construction of the North Division expansion in 2014 at a

total cost of $570,000; the expansion of the ERU garage at Police Headquarters in 2014 at a total cost of $1.1 million; the renovation and expansion of unfinished space in the Police Headquarters at a total cost of $750,000; the acquisition of land for the expansion of the Central Division Station in 2015 at a cost of $2.0 million; and the expansion and renovation of the Reporting Centre in 2015 at a cost of $663,000. A large part of the construction costs of the all these projects ($1.4 million or 27%) represents a renovation of existing space and is excluded from development charge recovery.

The addition of 15 new police cruisers over the next ten years, at a total cost of $717,500, has also been included in the capital program. Also included are recoveries of the cost of the oversized portions of the Investigative Services Unit—$6.0 million over 10 years—and North Division expansion—$357,000 over 5 years.

The total net capital program for the Waterloo Regional Police Service amounts to $12.2 million, of which $10.8 million is considered to be related to new development. Given this $10.8 million is less than the maximum allowable funding envelope of $16.3 million (adjusted downward to account for an uncommitted reserve fund deficit of $374,000), the entire amount is considered to be related to development within the ten year planning period. This $10.8 million, being exempt from the ten per cent reduction applied to other general services, is carried forward to the development charge calculation.

The ten year development-related net capital cost of $10.8 million is allocated 70% against residential development, or $7.6 million, and 30% against non-residential development, or $3.3 million. This yields unadjusted development charge rates of $71.91 per capita and $1.38 per m^2 respectively.

TABLE 3 CASH FLOW ANALYSIS

Given the front-ended nature of the capital program, the cash flow analysis increases the residential charge to $79.20 per capita and the non-residential charge to $1.54 per m^2.

The following table summarizes the calculation of the Waterloo Regional Police Service development charge:

WATERLOO REGIONAL POLICE SERVICE						
10-year Hist. Service Level	2014 - 2023 Development Related Capital Program		Unadjusted Development Charge		**Adjusted Development Charge**	
$/pop & emp	Total	Net DC Recoverable	$/capita	$/m^2	**$/capita**	**$/m^2**
$157.73	$12,211,675	$10,832,174	$71.91	$1.38	**$79.20**	**$1.54**

APPENDIX B.2
TABLE 1 - PAGE 1

REGION OF WATERLOO
INVENTORY OF CAPITAL ASSETS
WATERLOO REGIONAL POLICE SERVICE

BUILDINGS	# of Square Feet										UNIT COST
Facility Name	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	($/sq.ft.)
Police Headquarters	105,612	105,612	105,612	105,612	105,612	105,612	105,612	105,612	105,612	105,612	$359
Police Reporting Centre	9,264	9,264	9,264	9,264	9,264	9,264	9,264	9,264	9,264	9,264	$210
Central Division, Kitchener including Annex	65,000	65,000	65,000	65,000	65,000	65,000	65,000	65,000	65,000	65,000	$275
South Division, Cambridge	26,000	26,000	26,000	26,000	26,000	26,000	26,000	26,000	26,000	26,000	$289
North Division, Waterloo	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000		$339
New North Division, Waterloo										50,183	$262
New North Division, Waterloo - 2 floor parking deck										50,581	$37
Division 1A, New Hamburg	2,300	2,300	2,300	2,300	2,300	2,300	2,300	2,300	2,300	2,300	$337
Division 3A, Elmira (leased facility)	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	$337
Collision Reporting Centre (included in Police Reporting Centre)											$210
Firearms Training Facility			9,576	9,576	9,576	9,576	9,576	9,576	9,576	9,576	$370
Investigative Services Unit - 46,447 sqft total (7,500 unfinished)					33,000	33,000	33,000	33,000	46,447	46,447	$359
Total (sq.ft.)	**240,676**	**240,676**	**250,252**	**250,252**	**283,252**	**283,252**	**283,252**	**283,252**	**296,699**	**367,463**	
Total ($000)	**$77,036.8**	**$77,036.8**	**$80,575.8**	**$80,575.8**	**$92,427.3**	**$92,427.3**	**$92,427.3**	**$92,427.3**	**$97,256.6**	**$102,102.5**	

LAND	# of Hectares										UNIT COST
Facility Name	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	($/ha)
Police Headquarters	10.63	10.63	10.63	10.63	10.63	10.63	10.63	10.63	10.63	10.63	$490,000
Police Reporting Centre	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	$490,000
Central Division, Kitchener including Annex	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	$740,000
South Division, Cambridge	4.39	4.39	4.39	4.39	4.39	4.39	4.39	4.39	4.39	4.39	$740,000
North Division, Waterloo	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.81	$6,200,000
Division 1A, New Hamburg	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	$250,000
Division 3A, Elmira (leased facility)	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	$250,000
Collision Reporting Centre (included in Police Reporting Centre)	2.05	2.05	2.05	2.05	2.05	2.05	2.05	2.05	2.05	2.05	$490,000
Firearms Training Facility			0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	$490,000
Investigative Services Unit - 46,447 sqft total (7,500 unfinished)	1.26	1.26	1.26	1.26	1.26	1.26	1.26	1.26	1.26	1.26	$490,000
Total (ha)	**21.24**	**21.24**	**22.10**	**22.10**	**22.10**	**22.10**	**22.10**	**22.10**	**22.10**	**22.44**	
Total ($000)	**$14,512.8**	**$14,512.8**	**$14,932.2**	**$14,932.2**	**$14,932.2**	**$14,932.2**	**$14,932.2**	**$14,932.2**	**$14,932.2**	**$17,036.5**	

FULLY EQUIPPED VEHICLES	# of Vehicles										UNIT COST
Description	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	($/vehicle)
Marked Cruisers	105	107	110	111	112	115	118	125	131	135	$50,000
Motorcycles	8	9	9	9	9	9	9	9	9	9	$28,000
Unmarked Cruisers	112	114	116	118	119	119	119	119	119	119	$30,000
Total (#)	**226**	**230**	**235**	**237**	**240**	**243**	**246**	**253**	**259**	**263**	
Total ($000)	**$8,861.3**	**$9,038.5**	**$9,219.3**	**$9,320.0**	**$9,422.0**	**$9,572.0**	**$9,722.0**	**$10,072.0**	**$10,372.0**	**$10,572.0**	

APPENDIX B.2
TABLE 1 - PAGE 2

REGION OF WATERLOO
INVENTORY OF CAPITAL ASSETS
WATERLOO REGIONAL POLICE SERVICE

PERSONAL POLICE EQUIPMENT	# of Equipment										UNIT COST
Description	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	($)
Radios (mobile & base)	263	263	263	263	263	241	220	198	176	176	$3,314
Radios (portable)	469	469	469	469	469	533	596	660	723	500	$2,053
Pistols	751	751	751	751	751	761	761	800	830	782	$475
Servers	42	46	54	56	56	61	62	62	62	62	$6,000
Desktops	450	450	450	450	450	458	472	477	538	530	$1,500
Laptops	100	100	100	100	100	110	121	141	195	171	$2,000
C-8 Carbine Rifles								17	59	57	$2,300
Total (#)	**2,075**	**2,079**	**2,087**	**2,089**	**2,089**	**2,164**	**2,232**	**2,354**	**2,583**	**2,278**	
Total ($000)	**$3,318.2**	**$3,342.2**	**$3,390.2**	**$3,402.2**	**$3,402.2**	**$3,527.2**	**$3,634.5**	**$3,797.9**	**$4,166.5**	**$3,621.3**	

FURNITURE & EQUIPMENT	Total Value of Furniture & Equipment ($)									
Description	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Software RMS Niche			$1,186,096	$1,186,096	$1,186,096	$1,200,000	$1,200,000	$1,200,000	$1,200,000	$1,200,000
Software Switching	$711,045	$711,045	$711,045	$711,045	$711,045	$725,045	$739,045	$753,045	$769,658	$769,658
UPS				$95,573	$95,573	$95,573	$95,573	$95,573	$80,000	$80,000
PBX	$356,901	$356,901	$356,901	$455,357	$455,357	$455,357	$455,357	$1,000,000	$1,000,000	$1,000,000
Bomb Robot & Disposal Portable X-Ray	$162,473	$162,473	$162,473	$207,160	$207,160	$207,160	$207,160	$207,160	$224,237	$224,237
Dispatch System	$164,107	$164,107	$203,856	$203,856	$203,856	$411,856	$411,856	$411,856	$411,856	$486,782
Police Mobile Workstations in Cruisers	$869,901	$869,901	$869,901	$1,700,761	$1,700,761	$1,700,761	$915,840	$915,840	$915,840	$915,840
Furniture	$1,157,636	$1,358,817	$1,452,984	$1,547,151	$1,547,151	$1,737,151	$1,737,151	$1,737,151	$1,737,151	$2,739,901
Forensic Lab Equipment	$433,376	$433,376	$433,376	$433,376	$433,376	$433,376	$433,376	$469,100	$469,100	$469,100
Software CAD - Computer Aided Dispatch									$2,300,000	$2,300,000
IT Equipment at North Division										$575,000
Total ($000)	**$3,855.4**	**$4,056.6**	**$5,376.6**	**$6,540.4**	**$6,540.4**	**$6,966.3**	**$6,195.4**	**$6,789.7**	**$9,107.8**	**$10,760.5**

APPENDIX B.2
TABLE 1 - PAGE 3

REGION OF WATERLOO
CALCULATION OF SERVICE LEVELS
WATERLOO REGIONAL POLICE SERVICE

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	
Historic Population	479,036	488,470	497,081	504,141	511,511	516,304	521,109	531,705	538,303	543,733	
Historic Employment	247,380	252,820	259,310	263,890	266,430	257,110	268,490	276,240	286,630	291,440	
Total Population & Employment	**726,416**	**741,290**	**756,391**	**768,031**	**777,941**	**773,414**	**789,599**	**807,945**	**824,933**	**835,173**	**= (F)**

INVENTORY SUMMARY ($000)

Buildings	$77,036.8	$77,036.8	$80,575.8	$80,575.8	$92,427.3	$92,427.3	$92,427.3	$92,427.3	$97,256.6	$102,102.5	
Land	$14,512.8	$14,512.8	$14,932.2	$14,932.2	$14,932.2	$14,932.2	$14,932.2	$14,932.2	$14,932.2	$17,036.5	
Vehicles	$8,861.3	$9,038.5	$9,219.3	$9,320.0	$9,422.0	$9,572.0	$9,722.0	$10,072.0	$10,372.0	$10,572.0	
Personal Police Equipment	$3,318.2	$3,342.2	$3,390.2	$3,402.2	$3,402.2	$3,527.2	$3,634.5	$3,797.9	$4,166.5	$3,621.3	
Furniture & Equipment	$3,855.4	$4,056.6	$5,376.6	$6,540.4	$6,540.4	$6,966.3	$6,195.4	$6,789.7	$9,107.8	$10,760.5	
Total ($000)	**$107,584.5**	**$107,986.9**	**$113,494.1**	**$114,770.5**	**$126,724.0**	**$127,425.0**	**$126,911.3**	**$128,019.1**	**$135,835.2**	**$144,092.8**	**= (D)**

SERVICE LEVEL ($/pop & emp)

											10 Year 0 Service Level
Buildings	$106.05	$103.92	$106.53	$104.91	$118.81	$119.51	$117.06	$114.40	$117.90	$122.25	$113.13
Land	$19.98	$19.58	$19.74	$19.44	$19.19	$19.31	$18.91	$18.48	$18.10	$20.40	$19.31
Vehicles	$12.20	$12.19	$12.19	$12.13	$12.11	$12.38	$12.31	$12.47	$12.57	$12.66	$12.32
Personal Police Equipment	$4.57	$4.51	$4.48	$4.43	$4.37	$4.56	$4.60	$4.70	$5.05	$4.34	$4.56
Furniture & Equipment	$5.31	$5.47	$7.11	$8.52	$8.41	$9.01	$7.85	$8.40	$11.04	$12.88	$8.40
Total ($/pop & emp)	**$148.10**	**$145.67**	**$150.05**	**$149.43**	**$162.90**	**$164.76**	**$160.73**	**$158.45**	**$164.66**	**$172.53**	**$157.73**
											= (A)

REGION OF WATERLOO
CALCULATION OF MAXIMUM ALLOWABLE DC
WATERLOO REGIONAL POLICE SERVICE

10-Year Funding Envelope Calculation		
10 Year Average Service Level 2004 - 2013	$157.73	(A)
Net Population & Employment Growth in Region 2014 - 2023	141,045	(B)
Maximum Allowable Funding Envelope	$22,246,747	(C) = (A) x (B)
Less: Uncommitted Excess Capacity	$5,616,711	(H)
Less: 10% Legislated Reduction	$0	(I) = no 10% reduction
Discounted Maximum Allowable Funding Envelope	**$16,630,035**	(J) = (C) - (H) - (I)

Excess Capacity Calculation ($000)

2013 Inventory	$ 144,092.8	(D)
Using Average Service Level	$ 131,730.5	(E) = (A) * (F) / 1000
Committed Excess Capacity	$ 6,745.5	(G) (see Appendix E)
Uncommitted Excess Capacity	$ 5,616.7	(H) = greater of (D) - (E) - (G) or '0'

APPENDIX B.2
TABLE 2 - PAGE 1

REGION OF WATERLOO
2014 DEVELOPMENT CHARGES STUDY
DEVELOPMENT-RELATED CAPITAL PROGRAM

Project #	Project Description	Timing	(C) Total Project Cost	(D) Less Grants/ Subsidies/ Recoveries	(E) = (C) - (D) Net Cost	(F) Replacement and Benefit to Existing Share	(G) = (E) - (F) * 0% 0% Reduction	(H) = (E) - (F) - (G) Total Development-Related Costs	(I) = (H) up to sum of (B) Development-Related Costs 2014-2023	(J) = (I) - (H) Post 2023 or Service Level Increase	(K) = (I) + (J) Total
	2.00 WATERLOO REGIONAL POLICE SERVICE										
	2.1 Buildings, Land & Furnishings										
50022	2.1.1 Expansion of North Division	2014	$ 570,000	$ -	$ 570,000	$ 342,000	$ -	$ 228,000	$ 228,000	$ -	$ 228,000
50042	2.1.2 Expansion of Police Headquarters (ERU Garage)	2014	$ 1,100,000	$ -	$ 1,100,000	$ 550,000	$ -	$ 550,000	$ 550,000	$ -	$ 550,000
50043	2.1.3 Expansion/Renovation of Police Headquarters	2015	$ 750,000	$ -	$ 750,000	$ 487,500	$ -	$ 262,500	$ 262,500	$ -	$ 262,500
50039	2.1.4 Central Division (1) - Land Acquisition	2015	$ 2,040,000	$ -	$ 2,040,000	$ -	$ -	$ 2,040,000	$ 2,040,000	$ -	$ 2,040,000
50040	2.1.5 Expansion of Reporting Centre	2015	$ 663,000	$ -	$ 663,000	$ -	$ -	$ 663,000	$ 663,000	$ -	$ 663,000
	Sub-total Buildings, Land & Furnishings		$ 5,123,000	$ -	$ 5,123,000	$ 1,379,500	$ -	$ 3,743,500	$ 3,743,500	$ -	$ 3,743,500
	2.2 Vehicles and Equipment										
50000	2.2.1 New Police Vehicles and Equipment	2014	$ 143,500	$ -	$ 143,500	$ -	$ -	$ 143,500	$ 143,500	$ -	$ 143,500
50000	2.2.2 New Police Vehicles and Equipment	2016	$ 143,500	$ -	$ 143,500	$ -	$ -	$ 143,500	$ 143,500	$ -	$ 143,500
50000	2.2.3 New Police Vehicles and Equipment	2018	$ 143,500	$ -	$ 143,500	$ -	$ -	$ 143,500	$ 143,500	$ -	$ 143,500
50000	2.2.4 New Police Vehicles and Equipment	2020	$ 143,500	$ -	$ 143,500	$ -	$ -	$ 143,500	$ 143,500	$ -	$ 143,500
50000	2.2.5 New Police Vehicles and Equipment	2022	$ 143,500	$ -	$ 143,500	$ -	$ -	$ 143,500	$ 143,500	$ -	$ 143,500
	Sub-total Vehicles and Equipment		$ 717,500	$ -	$ 717,500	$ -	$ -	$ 717,500	$ 717,500	$ -	$ 717,500
	2.3 Recovery of Committed Excess Capacity										
50019	2.3.1 Oversized Investigative Services Unit	2014	$ 601,414	$ -	$ 601,414	$ -	$ -	$ 601,414	$ 601,414	$ -	$ 601,414
50019	Oversized Investigative Services Unit	2015	$ 601,414	$ -	$ 601,414	$ -	$ -	$ 601,414	$ 601,414	$ -	$ 601,414
50019	Oversized Investigative Services Unit	2016	$ 601,414	$ -	$ 601,414	$ -	$ -	$ 601,414	$ 601,414	$ -	$ 601,414
50019	Oversized Investigative Services Unit	2017	$ 601,414	$ -	$ 601,414	$ -	$ -	$ 601,414	$ 601,414	$ -	$ 601,414
50019	Oversized Investigative Services Unit	2018	$ 601,414	$ -	$ 601,414	$ -	$ -	$ 601,414	$ 601,414	$ -	$ 601,414
50019	Oversized Investigative Services Unit	2019	$ 601,414	$ -	$ 601,414	$ -	$ -	$ 601,414	$ 601,414	$ -	$ 601,414
50019	Oversized Investigative Services Unit	2020	$ 601,414	$ -	$ 601,414	$ -	$ -	$ 601,414	$ 601,414	$ -	$ 601,414
50019	Oversized Investigative Services Unit	2021	$ 601,414	$ -	$ 601,414	$ -	$ -	$ 601,414	$ 601,414	$ -	$ 601,414
50019	Oversized Investigative Services Unit	2022	$ 601,414	$ -	$ 601,414	$ -	$ -	$ 601,414	$ 601,414	$ -	$ 601,414
50019	Oversized Investigative Services Unit	2023	$ 601,414	$ -	$ 601,414	$ -	$ -	$ 601,414	$ 601,414	$ -	$ 601,414
50022	2.3.2 North Division Expansion	2014	$ 71,407	$ -	$ 71,407	$ -	$ -	$ 71,407	$ 71,407	$ -	$ 71,407
50022	North Division Expansion	2015	$ 71,407	$ -	$ 71,407	$ -	$ -	$ 71,407	$ 71,407	$ -	$ 71,407
50022	North Division Expansion	2016	$ 71,407	$ -	$ 71,407	$ -	$ -	$ 71,407	$ 71,406	$ -	$ 71,407
50022	North Division Expansion	2017	$ 71,407	$ -	$ 71,407	$ -	$ -	$ 71,407	$ 71,407	$ -	$ 71,407
50022	North Division Expansion	2018	$ 71,407	$ -	$ 71,407	$ -	$ -	$ 71,407	$ 71,407	$ -	$ 71,407
			$ 6,371,175	$ -	$ 6,371,175	$ -	$ -	$ 6,371,175	$ 6,371,174	$ -	$ 6,371,175
	TOTAL WATERLOO REGIONAL POLICE SERVICE		**$ 12,211,675**	**$ -**	**$ 12,211,675**	**$ 1,379,500**	**$ -**	**$ 10,832,175**	**$ 10,832,174** Lesser of (B) or (H)	**$ -**	**$ 10,832,175**

Residential Development Charge Calculation		
Residential Share of 2014-2023 Discounted Development-Related Capital Program	70%	$7,561,809
10 Year Growth in Population in New Units		105,151
Unadjusted Development Charge Per Capita ($)		**$71.91**
Non-Residential Development Charge Calculation		
Non-Residential Share of 2014-2023 Discounted Development-Related Capital Program	30%	$ 3,270,365
10 Year Growth in Square Meters		2,366,537
Unadjusted Development Charge Per m^2 ($)		**$1.38**

(A) 2013 - 2023 Discounted Funding Envelope = (J) on previous page	$ 16,630,035
Uncommitted Reserve Fund Balance as at Dec 31, 2013	$ (374,374)
(B) Adjusted 2014 - 2013 Funding Envelope	$ 16,255,661

APPENDIX B.2
TABLE 3 - PAGE 1

REGION OF WATERLOO
CASHFLOW AND DETERMINATION OF DEVELOPMENT CHARGE
WATERLOO REGIONAL POLICE SERVICE
RESIDENTIAL DEVELOPMENT CHARGE

2.00 WATERLOO REGIONAL POLICE SERVICE

OPENING CASH BALANCE FROM APPLICABLE RESERVES	($261,346)			**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**TOTAL**
OPENING CASH BALANCE ($000)				($261.3)	($784.5)	($2,673.9)	($2,530.4)	($2,265.9)	($2,071.2)	($1,672.3)	($1,336.9)	($837.3)	($494.3)	
2014-2023 RESIDENTIAL FUNDING REQUIREMENTS														
2.00 WATERLOO REGIONAL POLICE SERVICE - current ($000) (1)				$1,113.0	$2,590.7	$592.9	$498.4	$616.8	$463.5	$585.6	$482.3	$609.3	$501.7	**$8,054.3**
REVENUE - current ($000)	Rate for 2014													
- Dev. Charge Receipts (2)	$79.20	Inflation:	2.0%	$617.8	$793.8	$878.4	$895.2	$930.7	$967.5	$1,005.7	$1,045.5	$991.6	$1,025.9	**$9,152.1**
	Balance:	Positive	Negative											
- Interest on Opening Balance	Rate:	3.5%	5.5%	($14.4)	($43.1)	($147.1)	($139.2)	($124.6)	($113.9)	($92.0)	($73.5)	($46.1)	($27.2)	**($821.0)**
- Interest on In-year Transactions (excl.int.)	Rate:	3.5%	5.5%	($13.6)	($49.4)	$5.0	$6.9	$5.5	$8.8	$7.4	$9.9	$6.7	$9.2	**($3.7)**
TOTAL REVENUE ($000)				$589.8	$701.2	$736.3	$763.0	$811.6	$862.4	$921.1	$981.8	$952.2	$1,007.9	**$8,327.4**
CLOSING CASH BALANCE ($000)				($784.5)	($2,673.9)	($2,530.4)	($2,265.9)	($2,071.2)	($1,672.3)	($1,336.9)	($837.3)	($494.3)	$11.8	
POLICE PER CAPITA CHARGE	**$79.20**													
(1) Based on residential funding requirements in constant $000 of				*$1,113.0*	*$2,539.9*	*$569.9*	*$469.7*	*$569.9*	*$419.8*	*$520.0*	*$419.8*	*$520.0*	*$419.8*	***$7,561.8***
(2) Based on population growth in new units of				*7,800*	*9,827*	*10,661*	*10,652*	*10,856*	*11,064*	*11,276*	*11,492*	*10,686*	*10,839*	***105,151***

APPENDIX B.2
TABLE 3 - PAGE 2

REGION OF WATERLOO
CASHFLOW AND DETERMINATION OF DEVELOPMENT CHARGE
WATERLOO REGIONAL POLICE SERVICE
NON-RESIDENTIAL DEVELOPMENT CHARGE

2.00 WATERLOO REGIONAL POLICE SERVICE

OPENING CASH BALANCE FROM APPLICABLE RESERVES	($113,028)			**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**TOTAL**
OPENING CASH BALANCE ($000)				($113.0)	($366.4)	($1,271.3)	($1,264.2)	($1,158.7)	($1,068.0)	($885.7)	($724.8)	($489.0)	($279.3)	
2014-2023 NON-RESIDENTIAL FUNDING REQUIREMENTS														
2.00 WATERLOO REGIONAL POLICE SERVICE - current ($000) (1)				$481.3	$1,120.4	$256.4	$215.6	$266.8	$200.5	$253.3	$208.6	$263.5	$217.0	**$3,483.3**
REVENUE - current ($000)	Rate for 2014													
- Dev. Charge Receipts (2)	$1.54	Inflation:	2.0%	$240.8	$259.3	$332.1	$387.6	$418.6	$437.3	$459.3	$479.5	$496.1	$518.3	**$4,028.9**
	Balance:	Positive	Negative											
- Interest on Opening Balance	Rate:	3.5%	5.5%	($6.2)	($20.2)	($69.9)	($69.5)	($63.7)	($58.7)	($48.7)	($39.9)	($26.9)	($15.4)	**($419.1)**
- Interest on In-year Transactions (excl.int.)	Rate:	3.5%	5.5%	($6.6)	($23.7)	$1.3	$3.0	$2.7	$4.1	$3.6	$4.7	$4.1	$5.3	**($1.5)**
TOTAL REVENUE ($000)				$228.0	$215.5	$263.5	$321.1	$357.5	$382.7	$414.2	$444.4	$473.3	$508.2	**$3,608.3**
CLOSING CASH BALANCE ($000)				($366.4)	($1,271.3)	($1,264.2)	($1,158.7)	($1,068.0)	($885.7)	($724.8)	($489.0)	($279.3)	$12.0	
POLICE CHARGE PER M^2	**$1.54**													
(1) Based on non-residential funding requirements in constant $000 of				*$481.3*	*$1,098.5*	*$246.5*	*$203.1*	*$246.5*	*$181.6*	*$224.9*	*$181.6*	*$224.9*	*$181.6*	***$3,270.4***
(2) Based on non-residential GFA growth in square metres of				*156,335*	*165,097*	*207,257*	*237,141*	*251,116*	*257,167*	*264,815*	*271,036*	*274,962*	*281,611*	***2,366,537***

APPENDIX B.3

EMERGENCY MEDICAL SERVICES

APPENDIX B.3

EMERGENCY MEDICAL SERVICES

The Region has been responsible for Emergency Medical Services (EMS) since December 2000. The benefits of Emergency Medical Services are deemed to be Region-wide for the purpose of calculating the development charge.

TABLE 1 2004-2013 HISTORICAL SERVICE LEVELS

The EMS ten year historical inventory of capital assets includes a central operations centre and 10 satellite stations and other facilities (page 1). The combined area of all buildings is 40,002 ft^2 and the buildings are valued at $18.6 million. The land area associated with the buildings is 5.8 hectares and is valued at $4.1 million. Furniture and equipment add another $949,000 to the value of the inventory. Finally, ambulances and other vehicles add another $4.2 million to the value of the inventory.

The current replacement value of the EMS capital infrastructure is $27.7 million. It has provided the Region with a ten year average service level of $30.41 per capita and employment (page 2). This service level, when multiplied by the ten year growth in net population and employment, results in a ten year maximum allowable of $4.3 million that can be considered for recovery from development charges.

The Region's obligation to meet adequate response times and quality level of service, together with the recent growth in population, has necessitated recent construction of ambulance stations and other facilities across its service area. This has resulted in a notional excess capacity of service. However, as the excess capacity was created to meet the mandatory response time standards set out in other legislation,[1] its value is not removed from the calculation of the maximum allowable.

[1] See the Regulation in the Land Ambulance Certification Standards, June 2008, Part III (b.3): "The response time standard set under clause (b.1) and reported under clause (b.2) shall not be of a longer time duration than the 90th percentile response time standard for priority four emergency calls set by the operator who provided land ambulance and emergency response service in the area in 1996." Despite recent capital investment the Region has not yet achieved the 90th percentile response time standard.

EMS capital costs must be reduced by 10% as per the *DCA*. The discounted maximum allowable funding envelope is therefore $3.9 million. This amount is brought forward to the development charge calculation.

TABLE 2 2014 – 2023 DEVELOPMENT-RELATED CAPITAL PROGRAM & CALCULATION OF UNADJUSTED DEVELOPMENT CHARGE

The development-related capital program for EMS includes several projects that expand the capacity of EMS service: the construction of two new stations at Waterloo/Breslau ($804,000 in 2014) and Kitchener Downtown ($632,000 in 2014); the expansion of the Central Fleet Centre ($817,000 in 2016); and investments to expand service in Waterloo as per the EMS Master Plan ($4.6 million between 2017 and 2019). The total cost of the construction projects is estimated at $6.9 million, which is considered entirely development-related.

It is noted that the *2009 Background Study* considered the Kitchener Downtown Station to only be 40% development-related based on the thought that a significant driver for the demand for EMS services in the downtown was being driven by the changing demographics in the area and not just development. Upon review the need for this Station is now considered to be solely driven by the increased servicing needs of new development.

The addition of new ambulances over the next ten years, at a total cost of $636,000, has also been included in the capital program.

Altogether, the EMS capital program amounts to $7.5 million. No grants or subsidies are anticipated to offset the cost of the program. The entire $7.5 million is considered to be related to development in the Region. However, $752,000 is removed from the cost as it represents the mandatory 10% capital cost reduction under the *DCA*. Of the remaining $6.8 million, $3.1 million represents that portion of the program that exceeds the maximum allowable funding envelope (adjusted downward to account for an uncommitted reserve fund deficit of $205,000). This $3.1 million post-2023 share may be recovered from future development charges. The remaining $3.7 million (equal to the adjusted maximum allowable) is carried forward to the development charge calculation.

The development charge eligible cost of $3.7 million is allocated 70% against residential development, or $2.6 million, and 30% against non-residential development, or $1.1 million, based on the ratio of forecast growth in population in new units and employment in new floor space. This yields unadjusted development charge rates of $24.27 per capita and $0.47 per m^2 respectively.

TABLE 3 CASH FLOW ANALYSIS

After cash flow consideration, the residential charge is increased to $28.50 per capita (page 1) and the non-residential charge is increased to $0.56 per m^2. The increases reflect the front-ended nature of the capital program.

The following table summarizes the calculation of the EMS development charge:

EMERGENCY MEDICAL SERVICES						
10-year Hist. Service Level	2014 - 2023 Development Related Capital Program		Unadjusted Development Charge		**Adjusted Development Charge**	
$/pop & emp	Total	Net DC Recoverable	$/capita	$/$m^2$	**$/capita**	**$/$m^2$**
$30.41	$7,515,905	$3,655,239	$24.27	$0.47	**$28.50**	**$0.56**

APPENDIX B.3
TABLE 1 - PAGE 1

REGION OF WATERLOO
INVENTORY OF CAPITAL ASSETS
EMERGENCY MEDICAL SERVICES

BUILDINGS	# of Square Feet										UNIT COST
Facility Name	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	($/sq.ft.)
Building 1 - St. Jacobs	1,535	1,535	1,535	1,535	1,535	1,535	1,535	1,535	1,535	1,535	$464
Building 2 - St. Andrews, Cambridge	1,482	1,482	1,482	1,482	1,482	1,482	1,482	1,482	1,482	1,482	$464
Building 3 - Franklin/Ottawa, Kitchener		1,581	1,581	1,581	1,581	1,581	1,581	1,581	1,581	1,581	$464
Building 4 - EMS Central Operations Centre	21,037	21,037	21,037	21,037	21,037	21,037	21,037	21,037	23,782	23,782	$464
Building 5 - Forest Hill/Queen Boulevard	1,064	1,064	1,064	1,064	1,064	1,064	1,064	1,064	1,064	1,064	$464
Building 6 - Struck Ct, Cambridge	2,102	2,102	2,102	2,102	2,102	2,102	2,102	2,102			$464
Building 7 - Baden	1,412	1,412	1,412	1,412	1,412	1,412	1,412	1,412	1,412	1,412	$464
Building 8 - Westmount	2,318	2,318	2,318	2,318	2,318	2,318	2,318	2,318	2,318	2,318	$464
Building 9 - Victoria - Temporary Kitchener Downtown							2,100	2,100	2,100	2,100	$464
Building 10 - Conestoga College (2,990 sq.ft. incl. meeting rooms)								1,540	1,540	1,540	$464
Building 11 - Pinebush, Cambridge (leased space, incl meeting rooms)									3,188	3,188	$464
Total (sq.ft.)	**30,950**	**32,531**	**32,531**	**32,531**	**32,531**	**32,531**	**34,631**	**36,171**	**40,002**	**40,002**	
Total ($000)	**$14,360.8**	**$15,094.4**	**$15,094.4**	**$15,094.4**	**$15,094.4**	**$15,094.4**	**$16,068.8**	**$16,783.3**	**$18,560.9**	**$18,560.9**	

LAND	# of Hectares										UNIT COST
Facility Name	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	($/ha)
Building 1 - St. Jacobs	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	$490,000
Building 2 - St. Andrews, Cambridge	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	$490,000
Building 3 - Franklin/Ottawa, Kitchener		0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	$990,000
Building 4 - EMS Central Operations Centre	1.87	1.87	1.87	1.87	1.87	1.87	1.87	1.87	1.87	1.87	$740,000
Building 5 - Forest Hill/Queen Boulevard	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	$740,000
Building 6 - Struck Ct, Cambridge	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36			$490,000
Building 7 - Baden	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	$490,000
Building 8 - Westmount	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	$490,000
Building 9 - Victoria - Temp Kitchener Downtown - Transit Hub							0.39	0.39	0.39	0.39	$990,000
Building 10 - Conestoga College								0.50	0.50	0.50	$740,000
Building 11 - Pinebush, Cambridge - leased									0.36	0.36	$490,000
Total (ha)	**4.27**	**4.90**	**4.90**	**4.90**	**4.90**	**4.90**	**5.29**	**5.79**	**5.79**	**5.79**	
Total ($000)	**$2,684.8**	**$3,308.5**	**$3,308.5**	**$3,308.5**	**$3,308.5**	**$3,308.5**	**$3,694.6**	**$4,064.6**	**$4,064.6**	**$4,064.6**	

FURNITURE AND EQUIPMENT	# of Furniture and Equipment										UNIT COST
Description	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	($)
Defibrilators	18	18	18	18	19	19	19	20	20	23	$37,651
Respirators - FIT						2	2	2	2	2	$16,800
Servers	4	4	4	4	4	4	4	4	4	4	$12,240
Total (#)	**22**	**22**	**22**	**22**	**23**	**25**	**25**	**26**	**26**	**29**	
Total ($000)	**$726.7**	**$726.7**	**$726.7**	**$726.7**	**$764.3**	**$797.9**	**$797.9**	**$835.6**	**$835.6**	**$948.5**	

VEHICLES	# of Vehicles										UNIT COST
Description	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	($/vehicle)
Ambulances	16	16	17	18	18	18	20	21	21	22	$161,248
ERU	2	2	2	2	3	4	5	5	5	5	$66,300
ESU	1	1	1	1	1	1	1	1	1	1	$132,000
Utility/Fleet Van	1	1	1	1	1	1	1	1	1	1	$40,000
Trailer			3	3	4	4	4	4	4	4	$18,000
Trailer - generator					1	1	1	1	1	1	$35,000
Total (#)	**20**	**20**	**24**	**25**	**28**	**29**	**32**	**33**	**33**	**34**	
Total ($000)	**$2,884.6**	**$2,884.6**	**$3,099.8**	**$3,261.1**	**$3,380.4**	**$3,446.7**	**$3,835.5**	**$3,996.7**	**$3,996.7**	**$4,158.0**	

APPENDIX B.3
TABLE 1 - PAGE 2

REGION OF WATERLOO
CALCULATION OF SERVICE LEVELS
EMERGENCY MEDICAL SERVICES

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	
Historic Population	479,036	488,470	497,081	504,141	511,511	516,304	521,109	531,705	538,303	543,733	
Historic Employment	247,380	252,820	259,310	263,890	266,430	257,110	268,490	276,240	286,630	291,440	
Total Population and Employment	**726,416**	**741,290**	**756,391**	**768,031**	**777,941**	**773,414**	**789,599**	**807,945**	**824,933**	**835,173**	**= (F)**

INVENTORY SUMMARY ($000)

Buildings	$14,360.8	$15,094.4	$15,094.4	$15,094.4	$15,094.4	$15,094.4	$16,068.8	$16,783.3	$18,560.9	$18,560.9	
Land	$2,684.8	$3,308.5	$3,308.5	$3,308.5	$3,308.5	$3,308.5	$3,694.6	$4,064.6	$4,064.6	$4,064.6	
Furniture & Equipment	$726.7	$726.7	$726.7	$726.7	$764.3	$797.9	$797.9	$835.6	$835.6	$948.5	
Vehicles	$2,884.6	$2,884.6	$3,099.8	$3,261.1	$3,380.4	$3,446.7	$3,835.5	$3,996.7	$3,996.7	$4,158.0	
Total ($000)	**$20,656.8**	**$22,014.1**	**$22,229.4**	**$22,390.6**	**$22,547.6**	**$22,647.5**	**$24,396.8**	**$25,680.2**	**$27,457.8**	**$27,732.0**	**= (D)**

SERVICE LEVEL ($/pop & emp)

											10 Year Average Service Level
Buildings	$19.77	$20.36	$19.96	$19.65	$19.40	$19.52	$20.35	$20.77	$22.50	$22.22	$20.45
Land	$3.70	$4.46	$4.37	$4.31	$4.25	$4.28	$4.68	$5.03	$4.93	$4.87	$4.49
Furniture & Equipment	$1.00	$0.98	$0.96	$0.95	$0.98	$1.03	$1.01	$1.03	$1.01	$1.14	$1.01
Vehicles	$3.97	$3.89	$4.10	$4.25	$4.35	$4.46	$4.86	$4.95	$4.84	$4.98	$4.46
Total ($/pop & emp)	**$28.44**	**$29.70**	**$29.39**	**$29.15**	**$28.98**	**$29.28**	**$30.90**	**$31.78**	**$33.28**	**$33.21**	**$30.41**
											= (A)

REGION OF WATERLOO
CALCULATION OF MAXIMUM ALLOWABLE FUNDING ENVELOPE
EMERGENCY MEDICAL SERVICES

10-Year Funding Envelope Calculation		
10 Year Average Service Level 2004 - 2013	$30.41	(A)
Net Population & Employment Growth in Region 2014 - 2023	141,045	(B)
Maximum Allowable Funding Envelope	$4,289,167	(C) = (A) x (B)
Less: Uncommitted Excess Capacity[1]	$0	(H)
Less: 10% Legislated Reduction	$428,917	(I) = ((C) - (H)) * 10%
Discounted Maximum Allowable Funding Envelope	**$3,860,250**	(J) = (C) - (H) - (I)

Excess Capacity Calculation ($000)

2013 Inventory	$ 27,732.0	(D)
Using Average Service Level	$ 25,397.6	(E) = (A) * (F) / 1000
Committed Excess Capacity	$ 205.0	(G) (see Appendix E)
Uncommitted Excess Capacity	$ 2,129.4	(H) = greater of (D) - (E) - (G) or '0'

Note 1. Uncommitted excess capacity was created to meet mandatory response time standards set out in other legislation so value of excess capacity is not removed from maximum allowable funding envelope calculation (see DCA, O.Reg. 82/98, s.4. (3))

APPENDIX B.3
TABLE 2

REGION OF WATERLOO
2014 DEVELOPMENT CHARGES STUDY
DEVELOPMENT-RELATED CAPITAL PROGRAM

Project #	Project Description	Timing	(C) Total Project Cost	(D) Less Grants/ Subsidies/ Recoveries	(E) = (C) - (D) Net Cost	(F) Replacement and Benefit to Existing Share	(G) = (E) - (F) * 10% 10% Reduction	(H) = (E) - (F) - (G) Total Development-Related Costs	(I) = (H) up to sum of (B) Development-Related Costs 2014-2023	(J) = (I) - (H) Development-Related Costs Post 2023 or Service Level Increase	(K) = (I) + (J) Development-Related Costs Total
	3.00 EMERGENCY MEDICAL SERVICES										
	3.1 Buildings, Land & Furnishings										
82007	3.1.1 New EMS Station - Waterloo/Breslau	2014	$ 803,558	$ -	$ 803,558	$ -	$ 80,356	$ 723,202	$ 723,202	$ -	$ 723,202
82016	3.1.2 New EMS Station - Kitchener Downtown	2014	$ 631,887	$ -	$ 631,887	$ -	$ 63,189	$ 568,698	$ 568,698	$ -	$ 568,698
82025	3.1.3 Central Fleet Centre Expansion	2016	$ 816,669	$ -	$ 816,669	$ -	$ 81,667	$ 735,002	$ 735,002	$ -	$ 735,002
82019	3.1.4 EMS Station Master Plan	2017	$ 762,224	$ -	$ 762,224	$ -	$ 76,222	$ 686,002	$ 686,002	$ -	$ 686,002
82019		2018	$ 3,266,676	$ -	$ 3,266,676	$ -	$ 326,668	$ 2,940,008	$ 659,735	$ 2,280,273	$ 2,940,008
82019		2019	$ 598,891	$ -	$ 598,891	$ -	$ 59,889	$ 539,002	$ -	$ 539,002	$ 539,002
	Sub-total Buildings, Land & Furnishings		$ 6,879,905	$ -	$ 6,879,905	$ -		$ 6,191,915	$ 3,372,639	$ 2,819,275	$ 6,191,915
	3.2 Vehicles										
82024	3.2.1 New Ambulances	2015	$ 153,000	$ -	$ 153,000	$ -	$ 15,300	$ 137,700	$ 137,700	$ -	$ 137,700
82024	3.2.1 New Ambulances	2017	$ 161,000	$ -	$ 161,000	$ -	$ 16,100	$ 144,900	$ 144,900	$ -	$ 144,900
82024	3.2.1 New Ambulances	2019	$ 161,000	$ -	$ 161,000	$ -	$ 16,100	$ 144,900	$ -	$ 144,900	$ 144,900
82024	3.2.2 New Ambulances	2021	$ 161,000	$ -	$ 161,000	$ -	$ 16,100	$ 144,900	$ -	$ 144,900	$ 144,900
	Sub-total Vehicles		$ 636,000	$ -	$ 636,000	$ -		$ 572,400	$ 282,600	$ 289,800	$ 572,400
	3.3 Other Capital										
	3.3.1 None		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	Sub-total Other Capital		$ -	$ -	$ -	$ -		$ -	$ -	$ -	$ -
	TOTAL EMERGENCY MEDICAL SERVICES		**$ 7,515,905**	**$ -**	**$ 7,515,905**	**$ -**	**$ 751,591**	**$ 6,764,315**	**$ 3,655,239** Lesser of (B) or (H)	**$ 3,109,075**	**$ 6,764,315**

Residential Development Charge Calculation		
Residential Share of 2014-2023 Discounted Development-Related Capital Program	70%	$2,551,678
10 Year Growth in Population in New Units		105,151
Unadjusted Development Charge Per Capita ($)		**$24.27**
Non-Residential Development Charge Calculation		
Non-Residential Share of 2014-2023 Discounted Development-Related Capital Program	30%	$ 1,103,561
10 Year Growth in Square Meters		2,366,537
Unadjusted Development Charge Per m^2 ($)		**$0.47**

(A) 2013 - 2023 Discounted Funding Envelope = (J) on previous page	$ 3,860,250
Uncommitted Reserve Fund Balance as at Dec 31, 2013	$ (205,011)
(B) Adjusted 2014 - 2013 Funding Envelope	$ 3,655,239

APPENDIX B.3
TABLE 3 - PAGE 1

REGION OF WATERLOO
CASHFLOW AND DETERMINATION OF DEVELOPMENT CHARGE
EMERGENCY MEDICAL SERVICES
RESIDENTIAL DEVELOPMENT CHARGE

3.00 EMERGENCY MEDICAL SERVICES

OPENING CASH BALANCE FROM APPLICABLE RESERVES	($143,116)			**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**TOTAL**
OPENING CASH BALANCE ($000)				($143.1)	($849.2)	($705.0)	($967.5)	($1,322.1)	($1,562.9)	($1,294.7)	($997.7)	($669.8)	($343.6)	
2014-2023 RESIDENTIAL FUNDING REQUIREMENTS														
3.00 EMERGENCY MEDICAL SERVICES - current ($000) (1)				$901.9	$98.0	$533.8	$615.5	$498.5	$0.0	$0.0	$0.0	$0.0	$0.0	**$2,647.8**
REVENUE - current ($000)	Rate for 2014													
- Dev. Charge Receipts (2)	$28.50	Inflation:	2.0%	$222.3	$285.7	$316.1	$322.2	$334.9	$348.1	$361.9	$376.2	$356.8	$369.2	**$3,293.4**
	Balance:	Positive	Negative											
- Interest on Opening Balance	Rate:	3.5%	5.5%	($7.9)	($46.7)	($38.8)	($53.2)	($72.7)	($86.0)	($71.2)	($54.9)	($36.8)	($18.9)	**($487.1)**
- Interest on In-year Transactions (excl.int.)	Rate:	3.5%	5.5%	($18.7)	$3.3	($6.0)	($8.1)	($4.5)	$6.1	$6.3	$6.6	$6.2	$6.5	**($2.2)**
TOTAL REVENUE ($000)				$195.7	$242.3	$271.3	$260.9	$257.7	$268.2	$297.0	$327.9	$326.2	$356.8	**$2,804.1**
CLOSING CASH BALANCE ($000)				($849.2)	($705.0)	($967.5)	($1,322.1)	($1,562.9)	($1,294.7)	($997.7)	($669.8)	($343.6)	$13.2	
EMERGENCY MEDICAL SERVICES PER CAPITA CHARGE	**$28.50**													
(1) Based on residential funding requirements in constant $000 of				*$901.9*	*$96.1*	*$513.1*	*$580.0*	*$460.6*	*$0.0*	*$0.0*	*$0.0*	*$0.0*	*$0.0*	***$2,551.7***
(2) Based on population growth in new units of				*7,800*	*9,827*	*10,661*	*10,652*	*10,856*	*11,064*	*11,276*	*11,492*	*10,686*	*10,839*	***105,151***

APPENDIX B.3
TABLE 3 - PAGE 2

REGION OF WATERLOO
CASHFLOW AND DETERMINATION OF DEVELOPMENT CHARGE
EMERGENCY MEDICAL SERVICES
NON-RESIDENTIAL DEVELOPMENT CHARGE

3.00 EMERGENCY MEDICAL SERVICES

OPENING CASH BALANCE FROM APPLICABLE RESERVES	($61,895)			**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**TOTAL**
OPENING CASH BALANCE ($000)				($61.9)	($376.2)	($344.1)	($476.1)	($631.0)	($730.9)	($609.3)	($472.9)	($321.5)	($155.7)	
2014-2023 NON-RESIDENTIAL FUNDING REQUIREMENTS														
3.00 EMERGENCY MEDICAL SERVICES - current ($000) (1)				$390.0	$42.4	$230.9	$266.2	$215.6	$0.0	$0.0	$0.0	$0.0	$0.0	**$1,145.1**
REVENUE - current ($000)	Rate for 2014													
- Dev. Charge Receipts (2)	$0.56	Inflation:	2.0%	$87.5	$94.3	$120.8	$140.9	$152.2	$159.0	$167.0	$174.3	$180.4	$188.5	**$1,464.9**
	Balance:	Positive	Negative											
- Interest on Opening Balance	Rate:	3.5%	5.5%	($3.4)	($20.7)	($18.9)	($26.2)	($34.7)	($40.2)	($33.5)	($26.0)	($17.7)	($8.6)	**($229.9)**
- Interest on In-year Transactions (excl.int.)	Rate:	3.5%	5.5%	($8.3)	$0.9	($3.0)	($3.4)	($1.7)	$2.8	$2.9	$3.1	$3.2	$3.3	**($0.4)**
TOTAL REVENUE ($000)				$75.8	$74.5	$98.9	$111.3	$115.8	$121.6	$136.4	$151.3	$165.9	$183.2	**$1,234.6**
CLOSING CASH BALANCE ($000)				($376.2)	($344.1)	($476.1)	($631.0)	($730.9)	($609.3)	($472.9)	($321.5)	($155.7)	$27.6	
EMERGENCY MEDICAL SERVICES CHARGE PER M^2	**$0.56**													
(1) Based on non-residential funding requirements in constant $000 of				*$390.0*	*$41.6*	*$221.9*	*$250.9*	*$199.2*	*$0.0*	*$0.0*	*$0.0*	*$0.0*	*$0.0*	***$1,103.6***
(2) Based on non-residential GFA growth in square metres of				*156,335*	*165,097*	*207,257*	*237,141*	*251,116*	*257,167*	*264,815*	*271,036*	*274,962*	*281,611*	***2,366,537***

APPENDIX B.4

AIRPORT

APPENDIX B.4

AIRPORT

The Region of Waterloo International Airport is a fully equipped, certified airport facility that accommodates scheduled/charter passenger and air cargo facilities and services, business charter services, flight training, recreational flying, and aviation-related industrial/commercial business and service facilities.

For the purposes of calculating a development charge the Airport's service area is considered to include the Region of Waterloo and the Cities of Guelph and Stratford. The service area is currently estimated to contain 1.1 million persons and jobs.

TABLE 1 2004-2013 HISTORICAL SERVICE LEVELS

The Airport's ten year historical inventory of capital assets includes buildings with a total area of 86,316 ft^2 that is valued at $26.8 million (page 1). The land area associated with the buildings is 395.2 hectares and is valued at $245.0 million. Other infrastructure adds another $54.9 million to the value of the inventory.

The current replacement value of the Airport capital assets is estimated to be $326.7 million. It has provided the Region with a ten year average service level of $289.20 per capita and employment (page 2). This service level, multiplied by the ten year forecast of net population and employment growth in the Airport service area, results in a ten-year maximum allowable funding envelope of $51.7 million.

Recent capital investments have resulted in an excess capacity of service. The uncommitted portion of this excess capacity is valued at $10.6 million and must be netted off the maximum allowable. The resulting development charge eligible Airport capital costs must be reduced by 10% ($4.1 million) under the *DCA*.

The discounted maximum allowable funding envelope brought forward to the development charges calculation is $37.0 million.

TABLE 2 2014 – 2023 DEVELOPMENT-RELATED CAPITAL PROGRAM AND CALCULATION OF UNADJUSTED DEVELOPMENT CHARGES

The development-related capital program for the Airport includes $36.2 million of capital works. No grants or subsidies have been identified to offset the cost of the program.

The capital works are grouped into two types. Those identified as "4.1" capital works are considered to benefit both residential and non-residential development. Other works (identified as "4.2" projects) are related to the development of Airport land for future non-residential use only. A substantial portion of the total cost of all projects, $9.7 million, is deemed to benefit the existing community in the Airport service area as it represents either:

- an oversizing of a capital asset to accommodate development beyond the ten year planning horizon (Projects 3544 and 3580); or
- a qualitative increase in the level of service provided at the Airport (Projects 3565, 3583, 3574, and 3542); or
- works that are unrelated to meeting the increased service needs of new development (obstacle removal in Project 3518).

This benefit to existing share is therefore removed from the development charge calculation. The mandatory 10% discount of the development-related capital costs amounts to $2.7 million. Of the remaining $23.9 million, $9.0 million represents that portion of the program that is considered to benefit development beyond 2023. This $9.0 million post-2023 share may be recovered from future development charges. The remaining $14.9 million (less than the adjusted maximum allowable) is carried forward to the development charge calculation.

The development-related net capital cost of the 4.1 capital projects ($10.1 million) is allocated 68% against residential development, or $6.9 million, and 32% against non-residential development, or $3.2 million. The development-related net capital cost of the 4.2 capital projects, $4.8 million, is allocated entirely against non-residential development. This yields unadjusted development charge rates of $52.49 per capita and $2.53 per m^2 respectively.

TABLE 3 CASH FLOW ANALYSIS

After cash flow analysis, the calculated charges are increased to $68.50 per capita and $3.05 per m^2. The increase in the charges reflects the front-ended nature of the capital expenditures.

The following table summarizes the calculation of the Airport development charge:

AIRPORT						
10-year Hist. Service Level	2014 - 2023 Development Related Capital Program		Unadjusted Development Charge		**Adjusted Development Charge**	
$/pop & emp	Total	Net DC Recoverable	$/capita	$/$m^2$	**$/capita**	**$/$m^2$**
$289.20	$36,212,000	$14,901,210	$52.49	$2.53	**$68.50**	**$3.05**

APPENDIX B.4
TABLE 1 - PAGE 1

REGION OF WATERLOO
INVENTORY OF CAPITAL ASSETS
AIRPORT

BUILDINGS	# of Square Feet										UNIT COST
Facility Name	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**($/sq. ft.)**
Terminal Buildings (Bldg 544) incl Baggage Handling System	23,937	26,079	26,079	34,776	34,776	34,776	34,776	34,776	34,776	34,776	$294
Hangar 5 (Bldg 538)	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	$213
Maintenance Garage (Bldg 542)	7,680	7,680	7,680	7,680	7,680	7,680	7,680	7,680	7,680	7,680	$213
Electronics Centre Firehall (Bldg 537)	3,340	3,340	3,340	3,340	3,340	3,340	3,340	3,340	3,340	3,340	$213
Sand Storage (Bldg 523)		4,520	4,520	4,520	4,520	4,520	4,520	4,520	4,520	4,520	$214
Airport Operations Centre (#541)								28,000	28,000	28,000	$411
Total (sq.ft.)	**42,957**	**49,619**	**49,619**	**58,316**	**58,316**	**58,316**	**58,316**	**86,316**	**86,316**	**86,316**	
Total ($000)	**$11,088.3**	**$12,685.4**	**$12,685.4**	**$15,242.3**	**$15,242.3**	**$15,242.3**	**$15,242.3**	**$26,759.7**	**$26,759.7**	**$26,759.7**	

LAND	# of Hectares										UNIT COST
Facility Name	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**($/ha)**
Total Land Area	357.7	357.7	357.7	357.7	357.7	357.7	357.7	395.2	395.2	395.2	$620,000
Total (ha)	**357.7**	**357.7**	**357.7**	**357.7**	**357.7**	**357.7**	**357.7**	**395.2**	**395.2**	**395.2**	
Total ($000)	**$221,751.5**	**$221,751.5**	**$221,751.5**	**$221,751.5**	**$221,751.5**	**$221,751.5**	**$221,751.5**	**$245,038.8**	**$245,038.8**	**$245,038.8**	

OTHER INFRASTRUCTURE	Total Value of Other Infrastructure ($)									
Description	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**
Pavement (Runways, Taxiways, Aprons, Roads, Parking Lots)	$17,342,219	$17,023,777	$17,111,819	$17,193,404	$25,281,092	$25,078,549	$24,282,685	$26,775,584	$26,775,584	$27,389,584
Drainage	$9,850,393	$9,669,518	$9,698,008	$9,825,997	$9,964,785	$9,884,951	$9,571,253	$9,526,010	$9,526,010	$9,526,010
Lighting & Electrical Systems (including Fuel Tank, Signage)	$6,717,086	$6,593,745	$6,517,745	$6,475,268	$6,444,394	$6,392,763	$6,189,890	$6,620,503	$6,620,503	$6,620,503
Fencing & Security Gates	$3,028,007	$2,972,406	$2,925,094	$2,870,141	$2,821,610	$2,799,004	$2,710,178	$2,652,196	$2,652,196	$2,652,196
Water Pipeline System	$1,346,273	$1,321,553	$1,300,518	$1,276,085	$1,254,507	$1,244,457	$1,204,964	$1,680,903	$1,680,903	$1,680,903
Sewer Pipeline System	$682,663	$670,128	$659,462	$647,073	$636,131	$631,035	$611,009	$1,218,524	$1,218,524	$1,218,524
Equipment (incl. security & runway insp, noise monitor system)	$331,315	$414,070	$520,593	$622,265	$622,265	$673,808	$695,892	$711,105	$717,976	$717,976
Emergency Generator	$137,429	$137,429	$137,429	$137,429	$137,429	$148,812	$153,690	$157,050	$158,567	$158,567
Tractors	$392,472	$392,472	$392,472	$392,472	$392,472	$424,981	$438,910	$448,505	$452,838	$452,838
Loader	$217,966	$217,966	$217,966	$217,966	$217,966	$280,020	$289,198	$295,520	$298,376	$298,376
Firetruck			$377,752	$377,752	$377,752	$409,042	$1,259,922	$1,287,466	$1,299,905	$1,299,905
Runway Sweepsters	$597,429	$597,429	$597,429	$597,429	$597,429	$646,915	$668,117	$682,723	$689,320	$689,320
Snow Blowers	$177,164	$177,164	$774,679	$774,679	$774,679	$838,846	$866,340	$885,279	$893,833	$893,833
Mower			$42,458	$42,458	$42,458	$45,975	$47,482	$48,520	$48,988	$48,988
Fleet Vehicles	$985,950	$985,950	$985,950	$1,004,179	$1,004,179	$1,087,356	$1,122,994	$1,147,545	$1,158,632	$1,244,632
Total ($000)	**$41,806.4**	**$41,173.6**	**$42,259.4**	**$42,454.6**	**$50,569.1**	**$50,586.5**	**$50,112.5**	**$54,137.4**	**$54,192.2**	**$54,892.2**

APPENDIX B.4
TABLE 1 - PAGE 2

REGION OF WATERLOO
INVENTORY OF CAPITAL ASSETS
AIRPORT

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	
Historic Population (Region)	479,036	488,470	497,081	504,141	511,511	516,304	521,109	531,705	538,303	543,733	
Historic Employment (Region)	247,380	252,820	259,310	263,890	266,430	257,110	268,490	276,240	286,630	291,440	
Total Population and Employment (Region)	726,416	741,290	756,391	768,031	777,941	773,414	789,599	807,945	824,933	835,173	
Total Population and Employment (Guelph and Stratford)	227,114	230,352	233,639	235,236	236,849	238,478	240,123	241,784	246,008	250,321	
Total Population and Employment (Airport service area)	**953,530**	**971,642**	**990,030**	**1,003,266**	**1,014,790**	**1,011,891**	**1,029,721**	**1,049,729**	**1,070,941**	**1,085,494**	**= (F)**

INVENTORY SUMMARY ($000)

Buildings	$11,088.3	12685.39992	$12,685.4	$15,242.3	$15,242.3	$15,242.3	$15,242.3	$26,759.7	$26,759.7	$26,759.7	
Land	$221,751.5	$221,751.5	$221,751.5	$221,751.5	$221,751.5	$221,751.5	$221,751.5	$245,038.8	$245,038.8	$245,038.8	
Other Infrastructure	$41,806.4	$41,173.6	$42,259.4	$42,454.6	$50,569.1	$50,586.5	$50,112.5	$54,137.4	$54,192.2	$54,892.2	
Total ($000)	**$274,646.2**	**$275,610.5**	**$276,696.3**	**$279,448.4**	**$287,563.0**	**$287,580.4**	**$287,106.4**	**$325,936.0**	**$325,990.7**	**$326,690.7**	**= (D)**

SERVICE LEVEL ($/pop & emp)

											10 Year Average Service Level
Buildings	$11.63	$13.06	$12.81	$15.19	$15.02	$15.06	$14.80	$25.49	$24.99	$24.65	$17.27
Land	$232.56	$228.22	$223.98	$221.03	$218.52	$219.15	$215.35	$233.43	$228.81	$225.74	$224.68
Other Infrastructure	$43.84	$42.38	$42.68	$42.32	$49.83	$49.99	$48.67	$51.57	$50.60	$50.57	$47.25
Total ($/pop & emp)	**$288.03**	**$283.65**	**$279.48**	**$278.54**	**$283.37**	**$284.20**	**$278.82**	**$310.50**	**$304.40**	**$300.96**	**$289.20**
											= (A)

REGION OF WATERLOO
CALCULATION OF MAXIMUM ALLOWABLE DC
AIRPORT

10-Year Funding Envelope Calculation		
10 Year Average Service Level 2004 - 2013	$289.20	(A)
Net Population & Employment Growth 2014 - 2023	178,703	(B)
Maximum Allowable Funding Envelope	$51,679,920	(C) = (A) x (B)
Less: Uncommitted Excess Capacity	$10,612,730	(H)
Less: 10% Legislated Reduction	$4,106,719	(I) = ((C) - (H)) * 10%
Discounted Maximum Allowable Funding Envelope	**$36,960,471**	(J) = (C) - (H) - (I)

Excess Capacity Calculation ($000)

2013 Inventory	$ 326,690.7	(D)
Using Average Service Level	$ 313,919.5	(E) = (A) * (F) / 1000
Committed Excess Capacity	$ 2,158.5	(G) (see Appendix E)
Uncommitted Excess Capacity	$ 10,612.7	(H) = greater of (D) - (E) - (G) or '0'

APPENDIX B.4
TABLE 2

REGION OF WATERLOO
2014 DEVELOPMENT CHARGES STUDY
DEVELOPMENT-RELATED CAPITAL PROGRAM

Project #	Project Description	Timing	(C) Total Project Cost	(D) Less Grants/ Subsidies/ Recoveries	(E) = (C) - (D) Net Cost	(F) Replacement and Benefit to Existing Share	(G) = (E) - (F) * 10% 10% Reduction	(H) = (E) - (F) - (G) Total Development-Related Costs	(I) = (H) up to sum of (B) Development-Related Costs 2014-2023	(J) = (I) - (H) Development-Related Costs Post 2023 or Service Level Increase	(K) = (I) + (J) Development-Related Costs Total
	4.00 AIRPORT										
	4.1 Capital Projects - Residential & Non-Residential Benefit										
3579	4.1.1 Parking Lot Expansion	2015	$ 715,000	$ -	$ 715,000	$ -	$ 71,500	$ 643,500	$ 643,500	$ -	$ 643,500
3518	4.1.2 Property Acquisition/Obstacle Removal	2014	$ 804,000	$ -	$ 804,000	$ 723,600	$ 8,040	$ 72,360	$ 72,360	$ -	$ 72,360
		2017	$ 350,000	$ -	$ 350,000	$ 315,000	$ 3,500	$ 31,500	$ 31,500	$ -	$ 31,500
		2021	$ 350,000	$ -	$ 350,000	$ 315,000	$ 3,500	$ 31,500	$ 31,500	$ -	$ 31,500
3568	4.1.3 Terminal Building Phase 2	2015	$ 100,000	$ -	$ 100,000	$ -	$ 10,000	$ 90,000	$ 90,000	$ -	$ 90,000
		2016	$ 3,000,000	$ -	$ 3,000,000	$ -	$ 300,000	$ 2,700,000	$ 2,700,000	$ -	$ 2,700,000
		2022	$ 10,000,000	$ -	$ 10,000,000	$ -	$ 1,000,000	$ 9,000,000	$ -	$ 9,000,000	$ 9,000,000
3547	4.1.4 Airport Business Plan Update	2014	$ 165,000	$ -	$ 165,000	$ -	$ 16,500	$ 148,500	$ 148,500	$ -	$ 148,500
		2019	$ 165,000	$ -	$ 165,000	$ -	$ 16,500	$ 148,500	$ 148,500	$ -	$ 148,500
3565	4.1.5 Secondary Road Access	2017	$ 780,000	$ -	$ 780,000	$ 390,000	$ 39,000	$ 351,000	$ 351,000	$ -	$ 351,000
		2018	$ 1,225,000	$ -	$ 1,225,000	$ 612,500	$ 61,250	$ 551,250	$ 551,250	$ -	$ 551,250
3583	4.1.6 Runway 08/26 Extension	2016	$ 250,000	$ -	$ 250,000	$ 125,000	$ 12,500	$ 112,500	$ 112,500	$ -	$ 112,500
		2018	$ 10,500,000	$ -	$ 10,500,000	$ 5,250,000	$ 525,000	$ 4,725,000	$ 4,725,000	$ -	$ 4,725,000
3574	4.1.7 Security Upgrades to Class 2	2014	$ 100,000	$ -	$ 100,000	$ 50,000	$ 5,000	$ 45,000	$ 45,000	$ -	$ 45,000
3542	4.1.8 Runway 08 Approach Lighting	2022	$ 1,000,000	$ -	$ 1,000,000	$ 500,000	$ 50,000	$ 450,000	$ 450,000	$ -	$ 450,000
	Sub-total Res. & Non.Res. Benefit		$ 29,504,000	$ -	$ 29,504,000	$ 8,281,100	$ 2,122,290	$ 19,100,610	$ 10,100,610	$ 9,000,000	$ 19,100,610
	4.2 Capital Projects - Non-Residential Benefit Only										
3544	4.2.1 Sanitary Forcemain Servicing	2014	$ 248,000	$ -	$ 248,000	$ 124,000	$ 12,400	$ 111,600	$ 111,600	$ -	$ 111,600
		2015	$ 2,500,000	$ -	$ 2,500,000	$ 1,250,000	$ 125,000	$ 1,125,000	$ 1,125,000	$ -	$ 1,125,000
3580	4.2.2 Leased Land Development Phase 5	2014	$ 600,000	$ -	$ 600,000	$ -	$ 60,000	$ 540,000	$ 540,000	$ -	$ 540,000
		2016	$ 2,550,000	$ -	$ 2,550,000	$ -	$ 255,000	$ 2,295,000	$ 2,295,000	$ -	$ 2,295,000
3564	4.2.3 Randell Drain/Stormwater Upgrades	2014	$ 300,000	$ -	$ 300,000	$ -	$ 30,000	$ 270,000	$ 270,000	$ -	$ 270,000
		2015	$ 510,000	$ -	$ 510,000	$ -	$ 51,000	$ 459,000	$ 459,000	$ -	$ 459,000
	Sub-total Non-Residential Benefit only		$ 6,708,000	$ -	$ 6,708,000	$ 1,374,000	$ 533,400	$ 4,800,600	$ 4,800,600	$ -	$ 4,800,600
	TOTAL AIRPORT		**$ 36,212,000**	**$ -**	**$ 36,212,000**	**$ 9,655,100**	**$ 2,655,690**	**$ 23,901,210**	**$ 14,901,210** Lesser of (B) or (H)	**$ 9,000,000**	**$ 23,901,210**

Residential Development Charge Calculation		
Residential Share of 2014-2023 Growth-Related Capital Program - 4.1 Projects	68%	$6,868,415
Residential Share of 2014-2023 Growth-Related Capital Program - 4.2 Projects	0%	$0
Residential Share of 2014-2023 Growth-Related Capital Program - All Projects		$6,868,415
10 Year Growth in Population in New Units (Airport service area)		130,853
Unadjusted Development Charge Per Capita ($)		**$52.49**
Non-Residential Development Charge Calculation		
Non-Res. Share of 2014-2023 Growth-Related Capital Program - 4.1 Projects	32%	$ 3,232,195
Non-Res. Share of 2014-2023 Growth-Related Capital Program - 4.2 Projects	100%	$ 4,800,600
Non-Res. Share of 2014-2023 Growth-Related Capital Program - All Projects		$ 8,032,795
10 Year Growth in Square Meters (Airport service area)		3,175,279
Unadjusted Development Charge Per m^2 ($)		**$2.53**

(A) 2013 - 2023 Discounted Funding Envelope = (J) on previous page	$ 36,960,471
Uncommitted Reserve Fund Balance as at Dec 31, 2013	$ (2,158,475)
(B) Adjusted 2014 - 2013 Funding Envelope	$ 34,801,996

APPENDIX B.4
TABLE 3 - PAGE 1

REGION OF WATERLOO
CASHFLOW AND DETERMINATION OF DEVELOPMENT CHARGE
AIRPORT
RESIDENTIAL DEVELOPMENT CHARGE

4.00 AIRPORT

OPENING CASH BALANCE FROM APPLICABLE RESERVES	($1,467,763)			**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**TOTAL**
OPENING CASH BALANCE ($000)				($1,467.8)	($980.1)	($635.4)	($1,704.9)	($1,121.6)	($4,168.7)	($3,477.3)	($2,594.3)	($1,645.8)	($1,040.2)	
2014-2023 RESIDENTIAL FUNDING REQUIREMENTS														
4.00 AIRPORT - current ($000) (1)				$180.8	$508.8	$1,989.8	$276.0	$3,883.6	$111.5	$0.0	$24.6	$358.5	$0.0	**$7,333.6**
REVENUE - current ($000)	Rate for 2014													
- Dev. Charge Receipts (2)	$68.50	Inflation:	2.0%	$739.4	$900.5	$982.9	$941.5	$978.1	$1,016.3	$1,055.8	$1,097.0	$1,042.7	$1,078.8	**$9,833.0**
	Balance:	Positive	Negative											
- Interest on Opening Balance	Rate:	3.5%	5.5%	($80.7)	($53.9)	($34.9)	($93.8)	($61.7)	($229.3)	($191.3)	($142.7)	($90.5)	($57.2)	**($1,036.0)**
- Interest on In-year Transactions (excl.int.)	Rate:	3.5%	5.5%	$9.8	$6.9	($27.7)	$11.6	($79.9)	$15.8	$18.5	$18.8	$12.0	$18.9	**$4.6**
TOTAL REVENUE ($000)				$668.4	$853.4	$920.3	$859.4	$836.5	$802.9	$883.0	$973.1	$964.2	$1,040.5	**$8,801.6**
CLOSING CASH BALANCE ($000)				($980.1)	($635.4)	($1,704.9)	($1,121.6)	($4,168.7)	($3,477.3)	($2,594.3)	($1,645.8)	($1,040.2)	$0.3	
AIRPORT PER CAPITA CHARGE	**$68.50**													
(1) Based on residential funding requirements in constant $000 of				*$180.8*	*$498.8*	*$1,912.5*	*$260.1*	*$3,587.9*	*$101.0*	*$0.0*	*$21.4*	*$306.0*	*$0.0*	***$6,868.4***
(2) Based on population growth in new units of				*10,795*	*12,889*	*13,791*	*12,951*	*13,192*	*13,437*	*13,687*	*13,941*	*12,991*	*13,178*	***130,853***

APPENDIX B.4
TABLE 3 - PAGE 2

REGION OF WATERLOO
CASHFLOW AND DETERMINATION OF DEVELOPMENT CHARGE
AIRPORT
NON-RESIDENTIAL DEVELOPMENT CHARGE

4.00 AIRPORT

OPENING CASH BALANCE FROM APPLICABLE RESERVES	($690,712)			**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**TOTAL**
OPENING CASH BALANCE ($000)				($690.7)	($1,019.7)	($2,195.6)	($4,792.4)	($4,140.8)	($5,120.3)	($4,297.1)	($3,325.2)	($2,265.4)	($1,267.8)	
2014-2023 NON-RESIDENTIAL FUNDING REQUIREMENTS														
4.00 AIRPORT - current ($000) (1)				$1,006.7	$1,855.1	$3,324.1	$129.9	$1,827.6	$52.5	$0.0	$11.6	$168.7	$0.0	**$8,376.1**
REVENUE - current ($000)	Rate for 2014													
- Dev. Charge Receipts (2)	$3.05	Inflation:	2.0%	$723.5	$765.2	$914.3	$1,029.3	$1,096.0	$1,138.3	$1,187.4	$1,232.9	$1,271.6	$1,321.3	**$10,679.8**
	Balance:	Positive	Negative											
- Interest on Opening Balance	Rate:	3.5%	5.5%	($38.0)	($56.1)	($120.8)	($263.6)	($227.7)	($281.6)	($236.3)	($182.9)	($124.6)	($69.7)	**($1,601.3)**
- Interest on In-year Transactions (excl.int.)	Rate:	3.5%	5.5%	($7.8)	($30.0)	($66.3)	$15.7	($20.1)	$19.0	$20.8	$21.4	$19.3	$23.1	
TOTAL REVENUE ($000)				$677.7	$679.1	$727.3	$781.5	$848.1	$875.7	$971.8	$1,071.4	$1,166.3	$1,274.7	**$9,073.6**
CLOSING CASH BALANCE ($000)				($1,019.7)	($2,195.6)	($4,792.4)	($4,140.8)	($5,120.3)	($4,297.1)	($3,325.2)	($2,265.4)	($1,267.8)	$6.9	
AIRPORT CHARGE PER M^2	**$3.05**													
(1) Based on non-residential funding requirements in constant $000 of				*$1,006.7*	*$1,818.7*	*$3,195.0*	*$122.4*	*$1,688.4*	*$47.5*	*$0.0*	*$10.1*	*$144.0*	*$0.0*	***$8,032.8***
(2) Based on non-residential GFA growth in square metres of				*237,209*	*245,971*	*288,131*	*318,015*	*331,990*	*338,041*	*345,689*	*351,910*	*355,836*	*362,485*	***3,175,279***

APPENDIX B.5

TRANSIT

APPENDIX B.5

TRANSIT

The Region provides conventional transit services (i.e. buses) to its urban areas (primarily Kitchener, Cambridge, Waterloo). For the purpose of calculating a development charge for Transit only population and employment growth in the urban areas is considered.

TABLE 1 2004-2013 HISTORICAL SERVICE LEVELS

Transit's ten year historic inventory of capital assets includes two large storage yards (one in Kitchener and one in Cambridge), two passenger terminals (one in Kitchener and one in Cambridge), and a newly constructed facility in Kitchener (page 1). The combined area of the buildings is 391,761 ft^2 and they are valued at $67.2 million. The land area associated with the buildings is 9.8 hectares and is valued at $7.5 million. The fleet of 247 conventional buses is valued at $117.5 million. Shelters and other infrastructure at bus stops are valued at $14.3 million. Finally, systems and software, equipment, and transit-related studies add another $7.2 million to the value of the inventory (page 2).

The current replacement value of the Transit capital assets is $213.7 million. It has provided the Region with a ten year average service level of $238.15 per capita and employment (page 3). This service level, when multiplied by the ten year growth in net population and employment in the Transit service area, results in a ten year maximum allowable funding envelope of $29.3 million.

Recent capital investments in Transit, funded largely through property taxes, have resulted in an excess capacity of service. A portion of this excess capacity, represented by a Transit reserve fund deficit of $2.6 million, is considered committed under the *DCA*. In consultation with staff, it has been determined that the remaining $33.8 million is also committed excess capacity and this amount is also not deducted from the funding envelope calculation.

The maximum allowable funding envelope of $29.3 million for Transit must be reduced by 10% ($2.9 million) under the *DCA*. The discounted maximum allowable

funding envelope brought forward to the development charges calculation is therefore $26.4 million.

TABLE 2 2014 – 2023 DEVELOPMENT-RELATED CAPITAL PROGRAM AND CALCULATION OF UNADJUSTED DEVELOPMENT CHARGES

The development-related capital program for Transit includes $130.8 million of capital works. No grants or subsidies have been identified to offset the cost of the program.

The capital program includes two major expansions to the garage facilities: the remaining construction of the Strasburg garage in 2014 at a cost of $9.3 million; and a future garage expansion between 2014 and 2019 at a cost of $73.1 million. The addition of new conventional buses over the next ten years, at a total cost of $18.0 million, is also included in the program. Also included is $14.7 million worth of other capital, including Intelligent Transportation System (ITS) investments in automatic vehicle location control (AVL), automatic passenger count (APC), and card fare payment technology.

It is noted that ITS costs that are required to implement transit priority measures within road rights of way have been included in the Transportation service capital program (see Appendix C).

A significant portion of the technology cost, $12.9 million, is deemed to benefit the existing community in the Region as it represents an increase in the level of service provided on existing buses. This benefit to existing share calculation is shown in Table 1 below:

Table 1 – Calculation of Benefit to Existing for Transit Technology		
A	# of current fleet (including MobilityPlus)	281
B	# of new buses 2014-2023	39
C = B/A	% of new technology relating to new buses	12%

The net capital cost, less the benefit to existing share, is subject to the mandatory 10% capital cost discount under the *DCA*. The remaining $106.0 million is eligible for development charge recovery.

Of this $106.0 million development-related capital cost, $82.2 million represents that portion of the program that exceeds the maximum allowable funding envelope. This $82.2 million post-2023 share may be recovered from future development charges. The remaining $23.8 million (equal to the adjusted maximum allowable funding envelope) is carried forward to the development charge calculation.

The development charge eligible cost of $23.8 million is allocated 69% against residential development, or $16.4 million, and 31% against non-residential development, or $7.4 million, based on the ratio of forecast growth in population in new units and employment in new floor space. This yields unadjusted development charge rates of $186.24 per capita and $3.58 per m^2 respectively.

TABLE 3 CASH FLOW ANALYSIS

The cash flow analysis is displayed is Table 3. It considers the timing of the projects against the timing of the development charge revenues to determine adjusted calculated rates. After cash flow analysis, the residential charge increases to $242.50 per capita and the non-residential charge increases to $4.72 per m^2. The increase in the charge reflects the front-ended nature of the capital expenditures.

The following table summarizes the calculation of the Transit development charge.

TRANSIT						
10-year Hist. Service Level	2014 - 2023 Development Related Capital Program		Unadjusted Development Charge		**Adjusted Development Charge**	
$/pop & emp	Total	Net DC Recoverable	$/capita	$/$m^2$	**$/capita**	**$/$m^2$**
$238.15	$130,749,000	$ 23,802,597	$186.24	$3.58	**$242.50**	**$4.72**

APPENDIX B.5
TABLE 1 - PAGE 1

REGION OF WATERLOO
INVENTORY OF CAPITAL ASSETS
TRANSIT

BUILDINGS	# of Square Feet										UNIT COST
	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	($/sq. ft.)
Administration / Maintenance / Bus Storage											
250 Strasburg Road, Kitchener	156,240	156,240	198,241	198,241	198,241	198,241	198,241	198,241	198,241	198,241	$126
460 Conestoga Blvd., Cambridge	49,514	49,514	49,514	69,162	69,162	69,162	69,162	69,162	69,162	69,162	$126
85 Chandler Drive										96,728	$265
Passenger Terminals											
15 Charles Street West, Kitchener	21,143	21,143	21,143	21,143	21,143	21,143	21,143	21,143	21,143	21,143	$282
35 Ainslie Street, Cambridge	6,487	6,487	6,487	6,487	6,487	6,487	6,487	6,487	6,487	6,487	$282
Total (sq.ft.)	**233,384**	**233,384**	**275,385**	**295,033**	**295,033**	**295,033**	**295,033**	**295,033**	**295,033**	**391,761**	
Total ($000)	**$33,780.0**	**$33,780.0**	**$39,085.7**	**$41,567.8**	**$41,567.8**	**$41,567.8**	**$41,567.8**	**$41,567.8**	**$41,567.8**	**$67,200.7**	

LAND	# of Hectares										UNIT COST
	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	($/ha)
Administration / Maintenance / Bus Storage											
250 Strasburg Road, Kitchener	3.89	3.89	3.89	3.89	3.89	3.89	3.89	3.89	3.89	3.89	$740,000
460 Conestoga Blvd., Cambridge	1.27	1.27	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	$740,000
85 Chandler Drive										2.15	$740,000
Passenger Terminals											
15 Charles Street West, Kitchener	1.21	1.21	1.21	1.21	1.21	1.21	1.21	1.21	1.21	1.21	$990,000
35 Ainslie Street, Cambridge	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	$740,000
Total (ha)	**7.23**	**7.23**	**7.63**	**7.63**	**7.63**	**7.63**	**7.63**	**7.63**	**7.63**	**9.77**	
Total ($000)	**$5,650.3**	**$5,650.3**	**$5,949.8**	**$5,949.8**	**$5,949.8**	**$5,949.8**	**$5,949.8**	**$5,949.8**	**$5,949.8**	**$7,532.3**	

VEHICLES	# of Vehicles										UNIT COST
	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	($/vehicle)
Conventional Buses											
Low Floor	125	141	155	170	176	189	198	213	225	235	$463,700
High Floor	54	50	46	38	36	23	14	11			$463,700
Hybrids					6	6	6	12	12	12	$708,118
MobilityPlus Buses[1]	25	26	28	30	32	32	32	34	34	34	$0
Total (#)	**204**	**217**	**229**	**238**	**250**	**250**	**250**	**270**	**271**	**281**	
Total ($000)	**$83,002.3**	**$88,566.7**	**$93,203.7**	**$96,449.6**	**$102,553.1**	**$102,553.1**	**$102,553.1**	**$112,366.2**	**$112,829.9**	**$117,466.9**	

1. Currently being replaced on a 6 year cycle and thus not eligible for DC funding.

APPENDIX B.5
TABLE 1 - PAGE 2

REGION OF WATERLOO
INVENTORY OF CAPITAL ASSETS
TRANSIT

STOPS AND SHELTERS	# of Shelters										UNIT COST
	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	($/shelter)
Regular stops	314	314	314	314	314	314	314	332	348	358	$12,350
Regular stops (no shelters but landing pads with curb)	828	872	917	966	1,017	1,070	1,139	1,196	1,243	1253	$2,375
iXpress shelters		10	16	16	17	17	17	53	53	92	$27,300
Timed Transit Nodes	7	7	7	7	7	7	7	7	8	8	$545,600
Total (#)	**1,149**	**1,203**	**1,254**	**1,303**	**1,355**	**1,408**	**1,477**	**1,588**	**1,652**	**1,711**	
Total ($000)	**$9,663.5**	**$10,040.0**	**$10,312.7**	**$10,427.4**	**$10,575.4**	**$10,702.5**	**$10,866.3**	**$12,206.8**	**$13,061.6**	**$14,273.6**	

SYSTEMS, EQUIPMENT & STUDIES	# of Systems & Equipment										UNIT COST
	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	($)
Systems & Software											
Scheduling system		1	1	1	1	1	1	1	1	1	$800,000
Signal Priority software		1	1	1	1	1	1	1	1	1	$87,000
INIT Technologies (iXpress technology package)				1	1	1	1	1	1	1	$1,803,000
Video surveillance system									1	1	$231,000
Bus Lock System									1	1	$100,500
Equipment											
Garage Hoists (in ground)	14	16	16	18	18	18	18	18	18	26	$137,000
Portable Garage Hoists	1	1	1	3	3	3	3	3	3	2	$52,000
Transit Garage Scissor Lift (FM at OPS)	1	1	1	1	1	1	1	1	1	1	$45,000
Bus Wash	2	2	2	2	2	2	2	2	2	2	$78,000
Brake Lathe	2	2	2	2	2	2	2	2	2	1	$45,000
Tire Installer	1	1	1	1	1	1	1	1	1	1	$11,000
Tire Balancer	1	1	1	1	1	1	1	1	1	1	$8,000
Vault Receivers	3	3	3	3	3	3	3	3	3	3	$27,000
Studies											
Transportation Master Plan (transit component)	$63,819	$69,114	$52,027	$128,297	$541,000	$326,000	$140,500	$158,000	$87,500		
Central Transit Corridor Study	$5,504										
Road Improvement Transit Priority Strategy									$50,000		
Active Transportation Master Plan								$100,000	$257,000		
Transit Network Review						$50,000					
Commuter Parking Lot Feasibility Study									$75,000		
Transportation and Transit Forecast Model (transit portion)								$50,000	$125,000		
Road Improvement Transit Priority Strategy										$150,000	
Total (#)	**25**	**29**	**29**	**34**	**34**	**34**	**34**	**34**	**36**	**42**	
Total ($000)	**$2,430.3**	**$3,591.1**	**$3,574.0**	**$5,831.3**	**$6,244.0**	**$6,079.0**	**$5,843.5**	**$6,011.0**	**$6,629.0**	**$7,183.5**	

APPENDIX B.5
TABLE 1 - PAGE 3

REGION OF WATERLOO
CALCULATION OF SERVICE LEVELS
TRANSIT

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	
Historic Population (Transit Service Area)	426,396	434,790	442,447	448,420	454,520	457,890	461,532	470,570	475,993	480,527	
Historic Employment (Transit Service Area)	224,395	229,031	234,318	237,720	239,415	230,872	240,349	247,019	255,883	259,832	
Total Population & Employment (Transit Service Area)	**650,791**	**663,821**	**676,765**	**686,140**	**693,935**	**688,761**	**701,881**	**717,588**	**731,876**	**740,359**	**= (F)**

INVENTORY SUMMARY ($000)

Buildings	$33,780.0	$33,780.0	$39,085.7	$41,567.8	$41,567.8	$41,567.8	$41,567.8	$41,567.8	$41,567.8	$67,200.7	
Land	$5,650.3	$5,650.3	$5,949.8	$5,949.8	$5,949.8	$5,949.8	$5,949.8	$5,949.8	$5,949.8	$7,532.3	
Vehicles	$83,002.3	$88,566.7	$93,203.7	$96,449.6	$102,553.1	$102,553.1	$102,553.1	$112,366.2	$112,829.9	$117,466.9	
Shelters	$9,663.5	$10,040.0	$10,312.7	$10,427.4	$10,575.4	$10,702.5	$10,866.3	$12,206.8	$13,061.6	$14,273.6	
Systems & Equipment	$2,430.3	$3,591.1	$3,574.0	$5,831.3	$6,244.0	$6,079.0	$5,843.5	$6,011.0	$6,629.0	$7,183.5	
Total ($000)	**$134,526.4**	**$141,628.1**	**$152,126.0**	**$160,225.8**	**$166,890.1**	**$166,852.1**	**$166,780.5**	**$178,101.6**	**$180,038.1**	**$213,657.0**	**= (D)**

SERVICE LEVEL ($/pop & emp)

											10 Year Average Service Level
Buildings	$51.91	$50.89	$57.75	$60.58	$59.90	$60.35	$59.22	$57.93	$56.80	$90.77	$60.61
Land	$8.68	$8.51	$8.79	$8.67	$8.57	$8.64	$8.48	$8.29	$8.13	$10.17	$8.69
Vehicles	$127.54	$133.42	$137.72	$140.57	$147.78	$148.89	$146.11	$156.59	$154.17	$158.66	$145.15
Shelters	$14.85	$15.12	$15.24	$15.20	$15.24	$15.54	$15.48	$17.01	$17.85	$19.28	$16.08
Systems & Equipment	$3.73	$5.41	$5.28	$8.50	$9.00	$8.83	$8.33	$8.38	$9.06	$9.70	$7.62
Total ($/pop & emp)	**$206.71**	**$213.35**	**$224.78**	**$233.52**	**$240.50**	**$242.25**	**$237.62**	**$248.19**	**$246.00**	**$288.59**	**$238.15**
											= (A)

REGION OF WATERLOO
CALCULATION OF MAXIMUM ALLOWABLE FUNDING ENVELOPE
TRANSIT

10-Year Funding Envelope Calculation		
10 Year Average Service Level 2004 - 2013	$238.15	(A)
Net Population & Employment Growth 2014 - 2023	122,963	(B)
Maximum Allowable Funding Envelope	$29,283,531	(C) = (A) x (B)
Less: Uncommitted Excess Capacity	$0	(H)
Less: 10% Legislated Reduction	$2,928,353	(I) = ((C) - (H)) * 10%
Discounted Maximum Allowable Funding Envelope	**$26,355,178**	(J) = (C) - (H) - (I)

Excess Capacity Calculation ($000)

2013 Inventory	$ 213,657.0	(D)
Using Average Service Level	$ 176,316.6	(E) = (A) * (F) / 1000
Committed Excess Capacity	$ 2,552.6	(G) (see Appendix E)
Additional Committed Excess Capacity	$ 34,787.8	(H) = greater of (D) - (E) - (G) or '0'

APPENDIX B.5
TABLE 2 - PAGE 1

REGION OF WATERLOO
2014 DEVELOPMENT CHARGES STUDY
DEVELOPMENT-RELATED CAPITAL PROGRAM

				(C)	(D)	(E) = (C) - (D)	(F)	(G) = (E) - (F) * 10%	(H) = (E) - (F) - (G)	(I) = (H) up to sum of (B)	(J) = (I) - (H)	(K) = (I) + (J)
										Development-Related Costs		
Project #	Project Description		Timing	Total Project Cost	Less Grants/ Subsidies/ Recoveries	Net Cost	Replacement and Benefit to Existing Share	10% Reduction	Total Development-Related Costs	2014-2023	Post 2023 or Service Level Increase	Total
	5.00 TRANSIT											
	4.1 Facilities											
66062	4.1.1	Garage Expansion Strasburg	2014	$ 9,318,000	$ -	$ 9,318,000	$ -	$ 931,800	$ 8,386,200	$ 8,386,200	$ -	$ 8,386,200
66079	4.1.2	Future Garage Expansion - land acquisition	2014	$ 12,356,000	$ -	$ 12,356,000	$ -	$ 1,235,600	$ 11,120,400	$ 11,120,400	$ -	$ 11,120,400
66079		Future Garage Expansion - design and engineering	2017	$ 8,397,000	$ -	$ 8,397,000	$ -	$ 839,700	$ 7,557,300	$ -	$ 7,557,300	$ 7,557,300
66079		Future Garage Expansion - construction	2018	$ 27,875,000	$ -	$ 27,875,000	$ -	$ 2,787,500	$ 25,087,500	$ -	$ 25,087,500	$ 25,087,500
66079		Future Garage Expansion - construction	2019	$ 24,478,000	$ -	$ 24,478,000	$ -	$ 2,447,800	$ 22,030,200	$ -	$ 22,030,200	$ 22,030,200
66029	4.1.3	Passenger Station Development	2014	$ 2,500,000	$ -	$ 2,500,000	$ -	$ 250,000	$ 2,250,000	$ 2,250,000	$ -	$ 2,250,000
66029			2015	$ 5,548,000	$ -	$ 5,548,000	$ -	$ 554,800	$ 4,993,200	$ -	$ 4,993,200	$ 4,993,200
66029			2016	$ 6,000,000	$ -	$ 6,000,000	$ -	$ 600,000	$ 5,400,000	$ -	$ 5,400,000	$ 5,400,000
66029			2017	$ 1,548,000	$ -	$ 1,548,000	$ -	$ 154,800	$ 1,393,200	$ -	$ 1,393,200	$ 1,393,200
		Sub-Total Facilities		$ 98,020,000	$ -	$ 98,020,000	$ -	$ 9,802,000	$ 88,218,000	$ 21,756,600	$ 66,461,400	$ 88,218,000
	4.2 Fleet											
66008	4.2.1	Vehicle Additions Conventional	2015	$ 2,500,000	$ -	$ 2,500,000	$ -	$ 250,000	$ 2,250,000	$ 1,673,895	$ 576,105	$ 2,250,000
66008	4.2.2	Vehicle Additions Conventional	2016	$ 500,000	$ -	$ 500,000	$ -	$ 50,000	$ 450,000	$ -	$ 450,000	$ 450,000
66008	4.2.3	Vehicle Additions Conventional	2017	$ 1,000,000	$ -	$ 1,000,000	$ -	$ 100,000	$ 900,000	$ -	$ 900,000	$ 900,000
66008	4.2.4	Vehicle Additions Conventional	2019	$ 4,500,000	$ -	$ 4,500,000	$ -	$ 450,000	$ 4,050,000	$ -	$ 4,050,000	$ 4,050,000
66008	4.2.5	Vehicle Additions Conventional	2020	$ 5,000,000	$ -	$ 5,000,000	$ -	$ 500,000	$ 4,500,000	$ -	$ 4,500,000	$ 4,500,000
66008	4.2.6	Vehicle Additions Conventional	2021	$ 4,500,000	$ -	$ 4,500,000	$ -	$ 450,000	$ 4,050,000	$ -	$ 4,050,000	$ 4,050,000
		Sub-Total Fleet		$ 18,000,000	$ -	$ 18,000,000	$ -	$ 1,800,000	$ 16,200,000	$ 1,673,895	$ 14,526,105	$ 16,200,000
	4.3 Other Capital											
66071	4.3.1	AVL APC Technology Implementation	2014	$ 1,688,333	$ -	$ 1,688,333	$ 1,483,410	$ 20,492	$ 184,431	$ 184,431	$ -	$ 184,431
66071	4.3.2	AVL APC Technology Implementation	2015	$ 1,433,333	$ -	$ 1,433,333	$ 1,259,361	$ 17,397	$ 156,575	$ -	$ 156,575	$ 156,575
66071	4.3.3	AVL APC Technology Implementation	2016	$ 1,283,333	$ -	$ 1,283,333	$ 1,127,568	$ 15,577	$ 140,189	$ -	$ 140,189	$ 140,189
66071	4.3.4	AVL APC Technology Implementation	2017	$ 860,000	$ -	$ 860,000	$ 755,617	$ 10,438	$ 93,945	$ -	$ 93,945	$ 93,945
66071	4.3.5	AVL APC Technology Implementation	2018	$ 525,000	$ -	$ 525,000	$ 461,278	$ 6,372	$ 57,350	$ -	$ 57,350	$ 57,350
66071	4.3.6	AVL APC Technology Implementation	2019	$ 475,000	$ -	$ 475,000	$ 417,346	$ 5,765	$ 51,888	$ -	$ 51,888	$ 51,888
66071	4.3.7	AVL APC Technology Implementation	2020	$ 475,000	$ -	$ 475,000	$ 417,346	$ 5,765	$ 51,888	$ -	$ 51,888	$ 51,888
66071	4.3.8	AVL APC Technology Implementation	2021	$ 475,000	$ -	$ 475,000	$ 417,346	$ 5,765	$ 51,888	$ -	$ 51,888	$ 51,888
66071	4.3.9	AVL APC Technology Implementation	2022	$ 475,000	$ -	$ 475,000	$ 417,346	$ 5,765	$ 51,888	$ -	$ 51,888	$ 51,888
66071	4.3.10	AVL APC Technology Implementation	2023	$ 475,000	$ -	$ 475,000	$ 417,346	$ 5,765	$ 51,888	$ -	$ 51,888	$ 51,888
66059	4.3.11	Card Fare Payment Technology	2014	$ 1,718,000	$ -	$ 1,718,000	$ 1,509,476	$ 20,852	$ 187,671	$ 187,671	$ -	$ 187,671
66059	4.3.12	Card Fare Payment Technology	2015	$ 3,398,000	$ -	$ 3,398,000	$ 2,985,565	$ 41,244	$ 371,192	$ -	$ 371,192	$ 371,192
66059	4.3.13	Card Fare Payment Technology	2016	$ 1,448,000	$ -	$ 1,448,000	$ 1,272,248	$ 17,575	$ 158,177	$ -	$ 158,177	$ 158,177
		Sub-Total Other Capital		$ 14,729,000	$ -	$ 14,729,000	$ 12,941,255	$ 178,774	$ 1,608,970	$ 372,102	$ 1,236,868	$ 1,608,970
	TOTAL TRANSIT			**$ 130,749,000**	**$ -**	**$ 130,749,000**	**$ 12,941,255**	**$ 11,780,774**	**$ 106,026,970**	**$ 23,802,597** Lesser of (B) or (H)	**$ 82,224,373**	**$ 106,026,970**

Residential Development Charge Calculation		
Residential Share of 2014-2023 Discounted Development-Related Capital Program	69%	$16,420,070
10 Year Growth in Population in New Units		88,165
Unadjusted Development Charge Per Capita ($)		**$186.24**
Non-Residential Development Charge Calculation		
Non-Residential Share of 2014-2023 Discounted Development-Related Capital Program	31%	$ 7,382,527
10 Year Growth in Square Meters		2,062,796
Unadjusted Development Charge Per Sq.M ($)		**$3.58**

(A) 2013 - 2023 Discounted Funding Envelope = (J) on previous page	$ 26,355,178
Uncommitted Reserve Fund Balance as at Dec 31, 2013	$ (2,552,581)
(B) Adjusted 2014 - 2013 Funding Envelope	$ 23,802,597

APPENDIX B.5
TABLE 3 - PAGE 1

REGION OF WATERLOO
CASHFLOW AND DETERMINATION OF DEVELOPMENT CHARGE
TRANSIT
RESIDENTIAL DEVELOPMENT CHARGE

5.00 TRANSIT

OPENING CASH BALANCE FROM APPLICABLE RESERVES	($1,760,882)			**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**TOTAL**
OPENING CASH BALANCE ($000)				($1,760.9)	($15,921.3)	($15,874.1)	($14,367.9)	($12,827.3)	($11,135.6)	($9,250.2)	($7,159.6)	($4,827.5)	($2,522.5)	
2014-2023 RESIDENTIAL FUNDING REQUIREMENTS														
5.00 TRANSIT - current ($000) (1)				$15,265.3	$1,177.8	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	**$16,443.2**
REVENUE - current ($000)	Rate for 2014													
- Dev. Charge Receipts (2)	$242.50	Inflation:	2.0%	$1,578.2	$2,084.8	$2,338.4	$2,290.7	$2,356.0	$2,454.9	$2,554.6	$2,679.0	$2,526.3	$2,622.9	**$23,485.8**
	Balance:	Positive	Negative											
- Interest on Opening Balance	Rate:	3.5%	5.5%	($96.8)	($875.7)	($873.1)	($790.2)	($705.5)	($612.5)	($508.8)	($393.8)	($265.5)	($138.7)	**($5,260.6)**
- Interest on In-year Transactions (excl.int.)	Rate:	3.5%	5.5%	($376.4)	$15.9	$40.9	$40.1	$41.2	$43.0	$44.7	$46.9	$44.2	$45.9	**($13.6)**
TOTAL REVENUE ($000)				$1,105.0	$1,225.0	$1,506.2	$1,540.6	$1,691.7	$1,885.4	$2,090.5	$2,332.1	$2,305.0	$2,530.1	**$18,211.6**
CLOSING CASH BALANCE ($000)				($15,921.3)	($15,874.1)	($14,367.9)	($12,827.3)	($11,135.6)	($9,250.2)	($7,159.6)	($4,827.5)	($2,522.5)	$7.5	
TRANSIT PER CAPITA CHARGE	**$242.50**													
(1) Based on residential funding requirements in constant $000 of				*$15,265.3*	*$1,154.7*	*$0.0*	*$0.0*	*$0.0*	*$0.0*	*$0.0*	*$0.0*	*$0.0*	*$0.0*	***$16,420.1***
(2) Based on population growth in new units of				*6,508*	*8,429*	*9,268*	*8,902*	*8,976*	*9,169*	*9,354*	*9,618*	*8,892*	*9,050*	***88,165***

APPENDIX B.5
TABLE 3 - PAGE 2

REGION OF WATERLOO
CASHFLOW AND DETERMINATION OF DEVELOPMENT CHARGE
TRANSIT
NON-RESIDENTIAL DEVELOPMENT CHARGE

5.00 TRANSIT

OPENING CASH BALANCE FROM APPLICABLE RESERVES	($791,699)			**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**TOTAL**
OPENING CASH BALANCE ($000)				($791.7)	($7,227.0)	($7,459.0)	($6,967.2)	($6,297.6)	($5,506.5)	($4,620.7)	($3,626.2)	($2,521.8)	($1,310.9)	
2014-2023 NON-RESIDENTIAL FUNDING REQUIREMENTS														
5.00 TRANSIT - current ($000) (1)				$6,863.4	$529.6	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	**$7,392.9**
REVENUE - current ($000)	Rate for 2014													
- Dev. Charge Receipts (2)	$4.72	Inflation:	2.0%	$642.7	$692.2	$886.5	$1,034.7	$1,117.9	$1,168.2	$1,227.2	$1,281.4	$1,326.4	$1,386.1	**$10,763.3**
	Balance:	Positive	Negative											
- Interest on Opening Balance	Rate:	3.5%	5.5%	($43.5)	($397.5)	($410.2)	($383.2)	($346.4)	($302.9)	($254.1)	($199.4)	($138.7)	($72.1)	**($2,548.1)**
- Interest on In-year Transactions (excl.int.)	Rate:	3.5%	5.5%	($171.1)	$2.8	$15.5	$18.1	$19.6	$20.4	$21.5	$22.4	$23.2	$24.3	**($3.2)**
TOTAL REVENUE ($000)				$428.1	$297.6	$491.8	$669.6	$791.1	$885.8	$994.5	$1,104.4	$1,210.9	$1,338.3	**$8,212.0**
CLOSING CASH BALANCE ($000)				($7,227.0)	($7,459.0)	($6,967.2)	($6,297.6)	($5,506.5)	($4,620.7)	($3,626.2)	($2,521.8)	($1,310.9)	$27.4	
TRANSIT CHARGE PER M^2	**$4.72**													
(1) Based on non-residential funding requirements in constant $000 of				*$6,863.4*	*$519.2*	*$0.0*	*$0.0*	*$0.0*	*$0.0*	*$0.0*	*$0.0*	*$0.0*	*$0.0*	***$7,382.5***
(2) Based on non-residential GFA growth in square metres of				*136,164*	*143,785*	*180,518*	*206,563*	*218,807*	*224,166*	*230,877*	*236,351*	*239,841*	*245,723*	***2,062,796***

APPENDIX B.6

GENERAL GOVERNMENT

APPENDIX B.6

GENERAL GOVERNMENT

When calculating development charges, the *DCA* allows for the inclusion of the costs of undertaking studies related to the provision of development-related infrastructure, including development charges background studies.

TABLE 1 2014 – 2023 DEVELOPMENT-RELATED CAPITAL PROGRAM AND CALCULATION OF UNADJUSTED DEVELOPMENT CHARGES

Table 1 provides a list of development-related studies the Region anticipates undertaking during the 2014-2023 period. As required by the *DCA*, development charges studies must be undertaken every five years, thus two are included in the list. The total estimated cost of all studies is $4.4 million. No subsidies or benefit to existing shares have been identified.

The total net capital cost must be reduced by 10% as per the *DCA*. This results in a discounted cost of $4.0 million for the General Government service, which is brought forward to the development charge calculation. Of this cost, 70% ($2.8 million) is allocated against residential development and 30% ($1.2 million) is allocated against non-residential development. The calculated unadjusted charges that result are $26.31 per capita for new residential development and $0.51 per m^2 for new non-residential development.

TABLE 2 CASH FLOW ANALYSIS

After cash flow analysis, the residential charge increases to $33.40 per capita and the non-residential charge increases to $0.65 per m^2. The increase is the result of a substantial deficit in the General Government development charge reserve fund that is to be funded as committed excess capacity under the *DCA*, as well as the somewhat front-ended nature of the capital program.

The following table summarizes the calculation of the General Government development charge.

GENERAL GOVERNMENT					
2014 - 2023 Development Related Capital Program		Unadjusted Development Charge		**Adjusted Development Charge**	
Total	Net DC Recoverable	$/capita	$/m^2	**$/capita**	**$/m^2**
$4,403,000	$3,962,700	$26.31	$0.51	**$33.40**	**$0.65**

APPENDIX B.6
TABLE 1 - PAGE 1

REGION OF WATERLOO
2014 DEVELOPMENT CHARGES STUDY
DEVELOPMENT-RELATED CAPITAL PROGRAM

Project #	Project Description	Timing	(C) Total Project Cost	(D) Less Grants/ Subsidies/ Recoveries	(E) = (C) - (D) Net Cost	(F) Replacement and Benefit to Existing Share	(G) = (E) - (F) * 10% 10% Reduction	(H) = (E) - (F) - (G) Total Development-Related Costs	(I) = (H) up to sum of (B) Development-Related Costs 2014-2023	(J) = (I) - (H) Development-Related Costs Post 2023 or Service Level Increase	(K) = (I) + (J) Development-Related Costs Total
	6.00 GENERAL GOVERNMENT										
	6.1 Growth-Related Studies										
600005	6.1.1 RDC By-Law Review	2014	$ 50,000	$ -	$ 50,000	$ -	$ 5,000	$ 45,000	$ 45,000	$ -	$ 45,000
		2018	$ 300,000	$ -	$ 300,000	$ -	$ 30,000	$ 270,000	$ 270,000	$ -	$ 270,000
		2022	$ 300,000	$ -	$ 300,000	$ -	$ 30,000	$ 270,000	$ 270,000	$ -	$ 270,000
22007	6.1.2 Regional Smart Growth Initiative	2014	$ 758,000	$ -	$ 758,000	$ -	$ 75,800	$ 682,200	$ 682,200	$ -	$ 682,200
		2015	$ 250,000	$ -	$ 250,000	$ -	$ 25,000	$ 225,000	$ 225,000	$ -	$ 225,000
		2016	$ 250,000	$ -	$ 250,000	$ -	$ 25,000	$ 225,000	$ 225,000	$ -	$ 225,000
22021	6.1.3 Watershed Growth Studies	2014	$ 415,000	$ -	$ 415,000	$ -	$ 41,500	$ 373,500	$ 373,500	$ -	$ 373,500
		2015	$ 230,000	$ -	$ 230,000	$ -	$ 23,000	$ 207,000	$ 207,000	$ -	$ 207,000
		2016	$ 365,000	$ -	$ 365,000	$ -	$ 36,500	$ 328,500	$ 328,500	$ -	$ 328,500
		2017	$ 285,000	$ -	$ 285,000	$ -	$ 28,500	$ 256,500	$ 256,500	$ -	$ 256,500
		2018	$ 200,000	$ -	$ 200,000	$ -	$ 20,000	$ 180,000	$ 180,000	$ -	$ 180,000
		2019	$ 200,000	$ -	$ 200,000	$ -	$ 20,000	$ 180,000	$ 180,000	$ -	$ 180,000
		2020	$ 200,000	$ -	$ 200,000	$ -	$ 20,000	$ 180,000	$ 180,000	$ -	$ 180,000
		2021	$ 200,000	$ -	$ 200,000	$ -	$ 20,000	$ 180,000	$ 180,000	$ -	$ 180,000
		2022	$ 200,000	$ -	$ 200,000	$ -	$ 20,000	$ 180,000	$ 180,000	$ -	$ 180,000
		2023	$ 200,000	$ -	$ 200,000	$ -	$ 20,000	$ 180,000	$ 180,000	$ -	$ 180,000
	Subtotal Growth-Related Studies		$ 4,403,000	$ -	$ 4,403,000	$ -		$ 3,962,700	$ 3,962,700	$ -	$ 3,962,700
	6.2 Debt on Administration Building (none remaining)										
	TOTAL GENERAL GOVERNMENT		**$ 4,403,000**	**$ -**	**$ 4,403,000**	**$ -**	**$ 440,300**	**$ 3,962,700**	**$ 3,962,700** Lesser of (B) or (H)	**$ -**	**$ 3,962,700**

Residential Development Charge Calculation		
Residential Share of 2014-2023 Discounted Development-Related Capital Program	70%	$2,766,313
10 Year Growth in Population in New Units		105,151
Unadjusted Development Charge Per Capita ($)		**$26.31**
Non-Residential Development Charge Calculation		
Non-Residential Share of 2014-2023 Discounted Development-Related Capital Program	30%	$ 1,196,387
10 Year Growth in Square Meters		2,366,537
Unadjusted Development Charge Per m^2 ($)		**$0.51**

APPENDIX B.6
TABLE 2 - PAGE 1

REGION OF WATERLOO
CASHFLOW AND DETERMINATION OF DEVELOPMENT CHARGE
GENERAL GOVERNMENT
RESIDENTIAL DEVELOPMENT CHARGE

6.00 GENERAL GOVERNMENT

OPENING CASH BALANCE FROM APPLICABLE RESERVES	($486,600)			**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**TOTAL**
OPENING CASH BALANCE ($000)				($486.6)	($1,035.2)	($1,064.5)	($1,155.4)	($1,028.2)	($1,031.3)	($814.1)	($571.3)	($301.0)	($266.5)	
2014-2023 RESIDENTIAL FUNDING REQUIREMENTS														
6.00 GENERAL GOVERNMENT - current ($000) (1)				$768.4	$307.6	$402.0	$190.0	$340.0	$138.7	$141.5	$144.3	$368.1	$150.2	**$2,950.9**
REVENUE - current ($000)	Rate for 2014													
- Dev. Charge Receipts (2)	$33.40	Inflation:	2.0%	$260.5	$334.8	$370.5	$377.5	$392.5	$408.0	$424.1	$440.9	$418.2	$432.6	**$3,859.6**
	Balance:	Positive	Negative											
- Interest on Opening Balance	Rate:	3.5%	5.5%	($26.8)	($56.9)	($58.5)	($63.5)	($56.5)	($56.7)	($44.8)	($31.4)	($16.6)	($14.7)	**($426.5)**
- Interest on In-year Transactions (excl.int.)	Rate:	3.5%	5.5%	($14.0)	$0.5	($0.9)	$3.3	$0.9	$4.7	$4.9	$5.2	$0.9	$4.9	**$10.5**
TOTAL REVENUE ($000)				$219.8	$278.3	$311.1	$317.2	$336.9	$356.0	$384.3	$414.7	$402.5	$422.9	**$3,443.6**
CLOSING CASH BALANCE ($000)				($1,035.2)	($1,064.5)	($1,155.4)	($1,028.2)	($1,031.3)	($814.1)	($571.3)	($301.0)	($266.5)	$6.2	
GENERAL GOVERNMENT PER CAPITA CHARGE	**$33.40**													
(1) Based on residential funding requirements in constant $000 of				*$768.4*	*$301.6*	*$386.4*	*$179.1*	*$314.1*	*$125.7*	*$125.7*	*$125.7*	*$314.1*	*$125.7*	***$2,766.3***
(2) Based on population growth in new units of				*7,800*	*9,827*	*10,661*	*10,652*	*10,856*	*11,064*	*11,276*	*11,492*	*10,686*	*10,839*	***105,151***

APPENDIX B.6
TABLE 2 - PAGE 2

REGION OF WATERLOO
CASHFLOW AND DETERMINATION OF DEVELOPMENT CHARGE
GENERAL GOVERNMENT
NON-RESIDENTIAL DEVELOPMENT CHARGE

6.00 GENERAL GOVERNMENT

OPENING CASH BALANCE FROM APPLICABLE RESERVES	($210,447)			**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**TOTAL**
OPENING CASH BALANCE ($000)				($210.4)	($459.0)	($508.5)	($571.0)	($519.6)	($518.0)	($419.7)	($307.9)	($182.4)	($141.3)	
2014-2023 NON-RESIDENTIAL FUNDING REQUIREMENTS														
6.00 GENERAL GOVERNMENT - current ($000) (1)				$332.3	$133.0	$173.9	$82.2	$147.1	$60.0	$61.2	$62.4	$159.2	$64.9	**$1,276.2**
REVENUE - current ($000)	Rate for 2014													
- Dev. Charge Receipts (2)	$0.65	Inflation:	2.0%	$101.6	$109.5	$140.2	$163.6	$176.7	$184.6	$193.8	$202.4	$209.4	$218.8	**$1,700.6**
	Balance:	Positive	Negative											
- Interest on Opening Balance	Rate:	3.5%	5.5%	($11.6)	($25.2)	($28.0)	($31.4)	($28.6)	($28.5)	($23.1)	($16.9)	($10.0)	($7.8)	**($211.1)**
- Interest on In-year Transactions (excl.int.)	Rate:	3.5%	5.5%	($6.3)	($0.6)	($0.9)	$1.4	$0.5	$2.2	$2.3	$2.4	$0.9	$2.7	**$4.5**
TOTAL REVENUE ($000)				$83.7	$83.6	$111.3	$133.6	$148.6	$158.3	$173.0	$187.9	$200.2	$213.7	**$1,494.1**
CLOSING CASH BALANCE ($000)				($459.0)	($508.5)	($571.0)	($519.6)	($518.0)	($419.7)	($307.9)	($182.4)	($141.3)	$7.5	
GROWTH-RELATED STUDIES CHARGE PER M^2	**$0.65**													
(1) Based on non-residential funding requirements in constant $000 of				*$332.3*	*$130.4*	*$167.1*	*$77.4*	*$135.9*	*$54.3*	*$54.3*	*$54.3*	*$135.9*	*$54.3*	***$1,196.4***
(2) Based on non-residential GFA growth in square metres of				*156,335*	*165,097*	*207,257*	*237,141*	*251,116*	*257,167*	*264,815*	*271,036*	*274,962*	*281,611*	***2,366,537***

APPENDIX B.7

OPERATIONS & FACILITIES

APPENDIX B.7

OPERATIONS AND FACILITIES

Vehicles and equipment required to operate and maintain the Regional road network are stored at a central Regional Operations Centre and in several smaller rural facilities. The benefits of this Operations and Facilities service are deemed to be Region-wide for the purpose of calculating the development charge.

TABLE 1 2004-2013 HISTORICAL SERVICE LEVELS

The Operations and Facilities ten year historical inventory of capital assets includes the Regional Operations Centre and various other facilities and rural storage yards. The total building area is 209,226 ft^2 which is valued at $31.9 million. The land area associated with the buildings is 17.5 hectares and is valued at $10.5 million (page 1). Fleet vehicles add another $12.0 million to the value of the inventory (page 2). Finally, $1.7 million of furniture and equipment are included in the inventory (page 3).

The current replacement value of the Operations and Facilities capital infrastructure is $56.1 million. It has provided the Region with a ten year average service level of $71.13 per capita and employment (page 4). This service level, when multiplied by the ten year growth in net population and employment, results in a maximum allowable funding envelope of $10.0 million that can be considered for recovery through development charges.

No uncommitted excess capacity has been identified in the Operations and Facilities service. And given the service is considered to be "related to a highway" the service is considered exempt from the 10% capital cost reduction applied to other general services (see *DCA, s. 5. (5) 4.*). The full maximum allowable funding envelope of $10.0 million is therefore brought forward to the development charges calculation.

TABLE 2 2014 – 2023 DEVELOPMENT-RELATED CAPITAL PROGRAM AND CALCULATION OF UNADJUSTED DEVELOPMENT CHARGES

The development-related capital program for Operations and Facilities includes $69.9 million of capital works. No grants or subsidies have been identified to offset the cost of the program.

The capital program includes the expansion of the Regional Operations Centre in 2014, 2018 and 2019 for $6.7 million. A substantial portion of the total project cost, 75% or $5.0 million, is considered to be a benefit to existing share as it is related to providing roof cover for existing fleet.

The ongoing Kitchener Transit Terminal Security Upgrades ($418,000) are required for both existing and new Grand River Transit (GRT) buses. The development-related share of the cost of the Upgrades (12% or $66,000) is based on the ratio of new GRT buses over the current bus fleet (see the calculation in Appendix B.5 above).

The Waterloo Regional Voice Radio System Upgrades ($22.0 million between 2014 and 2017) are considered to have a Region-wide benefit to both existing residents and residents in new development. The costs associated with these projects have been assigned a development-related share based on the ratio of growth in population in new housing units and employment in new floor space over the 2023 Regional population and employment base.

Finally, the expansion of space related to Operations and Facilities services, as well as other development charge-eligible services that are exempt from the 10% capital cost reduction, is included as an eligible cost. This represents an estimated 5% of the $40.8 million expansion of the Administration Headquarters expansion between 2017 and 2021.

Altogether, $7.2 million in development-related net capital costs are eligible for development charge recovery. The $7.2 million is allocated 70% against residential development, or $5.0 million, and 30% against non-residential development, or $2.2 million. This yields unadjusted development charge rates of $47.61 per capita and $0.91 per m^2 respectively.

TABLE 3 CASH FLOW ANALYSIS

The cash flow analysis is displayed is Table 3. It considers the timing of the projects against the timing of the development charge revenues to determine adjusted calculated rates. After cash flow analysis, the residential charge is reduced to $36.40 per capita and the non-residential charge is reduced to $0.73 per m^2. The reduction is in part driven by a surplus of $1.9 million in the Operations and Facilities development charge reserve fund.

The following table summarizes the calculation of the Operations and Facilities development charge:

OPERATIONS AND FACILITIES						
10-year Hist. Service Level $/pop & emp	2014 - 2023 Development Related Capital Program Total	Net DC Recoverable	Unadjusted Development Charge $/capita	$/m2	**Adjusted Development Charge $/capita**	**$/m2**
$71.13	$69,913,740	$7,170,711	$47.61	$0.91	**$36.40**	**$0.73**

APPENDIX B.7
TABLE 1 - PAGE 1

REGION OF WATERLOO
INVENTORY OF CAPITAL ASSETS
OPERATIONS AND FACILITIES

BUILDINGS	# of Square Feet										UNIT COST
Facility Name	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**($/sq.ft.)**
Regional Operations Centre	116,175	116,175	116,175	116,175	116,175	116,175	116,175	116,175	116,175	116,175	$190
Various Outside Storage Facilities[1] & Voice Radio Building	15,010	15,010	15,010	15,010	15,010	15,010	15,010	15,010	15,010	15,010	$157
Salt Dome	7,022	7,022	7,022	7,022	7,022	7,022	7,022	7,022	7,022	7,022	$18
Truck Wash/Salt Storage				21,313	21,313	21,313	21,313	21,313	21,313	21,313	$140
Rural Yards											
Heidelberg Yard	9,819	9,819	9,819	9,819	9,819	9,819	9,819	9,819	9,819	9,819	$154
Heidelberg Equipment Storage	5,092	5,092	5,092	5,092	5,092	5,092	5,092	5,092	5,092	5,092	$87
North Dumfries Yard	4,250	4,250	4,250	4,250	4,250	4,250	4,250	4,250	4,250	4,250	$74
Phillipsburg Yard	9,931	9,931	9,931	9,931	9,931	9,931	9,931	9,931	9,931	9,931	$156
Elmira Salt Dome	7,605	7,605	7,605	7,605	7,605	7,605	7,605	7,605	7,605	7,605	$10
Heidelburg Salt Dome	4,164	4,164	4,164	4,164	4,164	4,164	4,164	4,164	4,164	4,164	$40
North Dumfries Salt Dome	4,205	4,205	4,205	4,205	4,205	4,205	4,205	4,205	4,205	4,205	$36
Phillipsburg Salt Dome	4,640	4,640	4,640	4,640	4,640	4,640	4,640	4,640	4,640	4,640	$36
Total (sq.ft.)	**187,913**	**187,913**	**187,913**	**209,226**	**209,226**	**209,226**	**209,226**	**209,226**	**209,226**	**209,226**	
Total ($000)	**$28,921.2**	**$28,921.2**	**$28,921.2**	**$31,902.8**	**$31,902.8**	**$31,902.8**	**$31,902.8**	**$31,902.8**	**$31,902.8**	**$31,902.8**	

1. Includes cold storage, volatile storage, and covered storage buildings.

LAND	# of Hectares										UNIT COST
Facility Name	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**($/ha)**
Regional Operations Centre	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5	$740,000
Rural Yards	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	$250,000
Total (ha)	**17.5**	**17.5**	**17.5**	**17.5**	**17.5**	**17.5**	**17.5**	**17.5**	**17.5**	**17.5**	
Total ($000)	**$10,500.0**	**$10,500.0**	**$10,500.0**	**$10,500.0**	**$10,500.0**	**$10,500.0**	**$10,500.0**	**$10,500.0**	**$10,500.0**	**$10,500.00**	

APPENDIX B.7
TABLE 1 - PAGE 2

REGION OF WATERLOO
INVENTORY OF CAPITAL ASSETS
OPERATIONS AND FACILITIES

VEHICLES	# of Vehicles										UNIT COST
Description	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	($/vehicle)
Operations Centre											
Vehicles Service Utility	2	2	2	2	2	2	2	2	2	2	$115,000
Vehicles 4x4	1	1	1	1	1	1	1	1	1	1	$40,000
4 x 4 Pickups	4	4	4	5	5	5	5	5	5	5	$20,000
1/2 Ton	1	1	1	1	1	1	1	1	1	1	$20,000
3/4 Ton Van	2	2	2	2	2	3	3	3	3	3	$30,000
Cars	4	4	4	4	4	4	4	5	5	5	$20,000
Ford Econ Transconnect (FM at OPS)		1	1	1	1	1	1	1	1	1	$35,000
Transportation - Roads											
1/2 Ton Pickups	15	13	13	13	13	13	13	13	13	12	$33,000
3/4 Ton Pickups (Stake & Flatbed Trucks)	4	3	4	4	3	3	3	3	2	3	$37,000
Concrete Truck	1	1	1	1	1	1	1	1	1	1	$80,000
Vacuum Sweeper	2	2	2	2	2	2	2	2	2	2	$290,000
Dump Trucks - 1 ton	4	4	5	5	5	5	5	5	5	5	$70,000
Dump Trucks - Ubody	21	18	18	18	18	18	18	18	18	18	$310,000
Graders	3	3	3	2	2	2	2	2	2	2	$260,000
Backhoes	2	2	2	2	2	2	2	2	2	2	$120,000
Loaders	3	3	3	3	3	3	4	4	3	3	$190,000
Tractors	5	5	5	5	5	5	5	4	4	4	$160,000
Van	1	1	1	1	1	1	1	1	1	1	$35,000
Transportation - Traffic											
1/2 Ton Pickup	3	3	2	2	2	1	3	3	3	3	$33,000
3/4 Ton Pickup	3	3	4	4	4	3	1	1	1	1	$55,000
Van	4	4	4	4	5	5	5	5	5	5	$65,000
Aerial	4	4	4	4	4	4	4	4	4	4	$240,000
Sign Truck	2	2	3	3	2	3	3	3	2	2	$180,000
Centre Liner					1	1	1	1	1	1	$450,000
Total (#)	**91**	**86**	**89**	**89**	**89**	**89**	**90**	**90**	**87**	**87**	
Total ($000)	**$12,872.0**	**$11,874.0**	**$12,183.0**	**$11,943.0**	**$12,241.0**	**$12,363.0**	**$12,509.0**	**$12,369.0**	**$11,962.0**	**$11,966.0**	

APPENDIX B.7
TABLE 1 - PAGE 3

REGION OF WATERLOO
INVENTORY OF CAPITAL ASSETS
OPERATIONS AND FACILITIES

FURNITURE & EQUIPMENT	**# of Furniture & Equipment**										**UNIT COST**
Description	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**($/vehicle)**
Light Hoists in ground (including installation cost)	4	4	4	4	4	4	4	4	4	4	$27,000
Med Hoists above ground (including installation cost)	3	3	3	3	3	3	3	3	3	3	$20,000
Heavy Hoists (including installation cost)	5	5	5	5	5	5	5	5	5	5	$50,000
Overhead crane at OPS	1	1	1	1	1	1	1	1	1	1	$100,000
Tire Changer (1) (Hunter)	1	1	1	1	1	1	1	1	1	1	$25,500
Tire Changer (2) (Coates)	1	1	1	1	1	1	1	1	1	1	$25,500
Env. Parts Washers	1	1	1	1	1	1	1	1	1	1	$8,160
Car Wheel Balancer	1	1	1	1	1	1	1	1	1	1	$8,670
Tester	1	1	1	1	1	1	1	1	1	1	$6,120
Portable Grease Equipment	1	1	1	1	1	1	1	1	1	1	$6,500
Anti-Freeze Recycling Equipment	1	1	1	1	1	1	1	1	1	1	$5,100
A/C Fluid Recycling Equipment	1	1	1	1	1	1	1	1	1	1	$10,200
Brake Motor Lathe	1	1	1	1	1	1	1	1	1	1	$11,000
Monitor/Scope Scan Tools	1	1	1	1	1	1	1	1	1	1	$15,300
Fleet Maintenance System	1	1	1	1	1	1	1	1	1	1	$200,000
Emission Testing Equipment	1	1	1	1	1	1	1	1	1	1	$21,000
OPS Zoom Boom (FM at OPS)	1	1	1	1	1	1	1	1	1	1	$60,000
275 KW Standby generator (FM at OPS)	1	1	1	1	1	1	1	1	1	1	$154,000
275 KW Standby generator (FM at OPS)	1	1	1	1	1	1	1	1	1	1	$154,000
John Deere Mower (FM at OPS)	1	1	1	1	1	1	1	1	1	1	$40,000
Furniture & Equipment (excluding computer equipment)	$381,000	$425,000	$425,000	$425,000	$425,000	$425,000	$425,000	$425,000	$425,000	$425,000	
Total (#)	**29**	**29**	**29**	**29**	**29**	**29**	**29**	**29**	**29**	**29**	
Total ($000)	**$1,650.1**	**$1,694.1**	**$1,694.1**	**$1,694.1**	**$1,694.1**	**$1,694.1**	**$1,694.1**	**$1,694.1**	**$1,694.1**	**$1,694.1**	

APPENDIX B.7
TABLE 1 - PAGE 4

REGION OF WATERLOO
CALCULATION OF SERVICE LEVELS
OPERATIONS AND FACILITIES

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	
Historic Population	479,036	488,470	497,081	504,141	511,511	516,304	521,109	531,705	538,303	543,733	
Historic Employment	247,380	252,820	259,310	263,890	266,430	257,110	268,490	276,240	286,630	291,440	
Total Population & Employment	**726,416**	**741,290**	**756,391**	**768,031**	**777,941**	**773,414**	**789,599**	**807,945**	**824,933**	**835,173**	**= (F)**

INVENTORY SUMMARY ($000)

Buildings	$28,921.2	$28,921.2	$28,921.2	$31,902.8	$31,902.8	$31,902.8	$31,902.8	$31,902.8	$31,902.8	$31,902.8	
Land	$10,500.0	$10,500.0	$10,500.0	$10,500.0	$10,500.0	$10,500.0	$10,500.0	$10,500.0	$10,500.0	$10,500.0	
Vehicles	$12,872.0	$11,874.0	$12,183.0	$11,943.0	$12,241.0	$12,363.0	$12,509.0	$12,369.0	$11,962.0	$11,966.0	
Furniture & Equipment	$1,650.1	$1,694.1	$1,694.1	$1,694.1	$1,694.1	$1,694.1	$1,694.1	$1,694.1	$1,694.1	$1,694.1	
Total ($000)	**$53,943.3**	**$52,989.3**	**$53,298.3**	**$56,039.9**	**$56,337.9**	**$56,459.9**	**$56,605.9**	**$56,465.9**	**$56,058.9**	**$56,062.9**	**= (D)**

SERVICE LEVELS ($/pop & emp)

											10 Year Average Service Level
Buildings	$39.81	$39.01	$38.24	$41.54	$41.01	$41.25	$40.40	$39.49	$38.67	$38.20	$39.76
Land	$14.45	$14.16	$13.88	$13.67	$13.50	$13.58	$13.30	$13.00	$12.73	$12.57	$13.48
Vehicles	$17.72	$16.02	$16.11	$15.55	$15.74	$15.98	$15.84	$15.31	$14.50	$14.33	$15.71
Furniture & Equipment	$2.27	$2.29	$2.24	$2.21	$2.18	$2.19	$2.15	$2.10	$2.05	$2.03	$2.17
Total ($/pop & emp)	**$74.26**	**$71.48**	**$70.46**	**$72.97**	**$72.42**	**$73.00**	**$71.69**	**$69.89**	**$67.96**	**$67.13**	**$71.13**
											= (A)

REGION OF WATERLOO
CALCULATION OF MAXIMUM ALLOWABLE
OPERATIONS AND FACILITIES

10-Year Funding Envelope Calculation		
10 Year Average Service Level 2004 - 2013	$71.13	(A)
Net Population & Employment Growth in Region 2014 - 2023	141,045	(B)
Maximum Allowable Funding Envelope	$10,031,833	(C) = (A) x (B)
Less: Uncommitted Excess Capacity	$0	(H)
Less: 10% Legislated Reduction	$0	(I) = no 10% reduction
Discounted Maximum Allowable Funding Envelope	**$10,031,833**	(J) = (C) - (H) - (I)

Excess Capacity Calculation ($000)

2013 Inventory	$ 56,062.9	(D)
Using Average Service Level	$ 59,401.9	(E) = (A) * (F) / 1000
Committed Excess Capacity	$ -	(G) (see Appendix E)
Uncommitted Excess Capacity	$ -	(H) = greater of (D) - (E) - (G) or '0'

APPENDIX B.7
TABLE 2 - PAGE 1

REGION OF WATERLOO
2014 DEVELOPMENT CHARGES STUDY
DEVELOPMENT-RELATED CAPITAL PROGRAM

Project #	Project Description	Timing	(C) Total Project Cost	(D) Less Grants/ Subsidies/ Recoveries	(E) = (C) - (D) Net Cost	(F) Replacement and Benefit to Existing Share	(G) = (E) - (F) * 0% 0% Reduction	(H) = (E) - (F) - (G) Total Development-Related Costs	(I) = (H) up to sum of (B) Development-Related Costs 2014-2023	(J) = (I) - (H) Development-Related Costs Post 2023 or Service Level Increase	(K) = (I) + (J) Development-Related Costs Total
	7.00 OPERATIONS AND FACILITIES										
	7.1 Facilities Upgrades and Expansions										
90113	7.1.1 Regional Operations Centre Expansion	2014	$ 145,000	$ -	$ 145,000	$ 108,750	$ -	$ 36,250	$ 36,250	$ -	$ 36,250
		2016	$ 3,699,540	$ -	$ 3,699,540	$ 2,774,655	$ -	$ 924,885	$ 924,885	$ -	$ 924,885
		2017	$ 2,815,200	$ -	$ 2,815,200	$ 2,111,400	$ -	$ 703,800	$ 703,800	$ -	$ 703,800
90076	7.1.2 Kitchener Transit Terminal Security Upgrade	Various	$ 418,000	$ -	$ 418,000	$ 352,308	$ -	$ 65,692	$ 65,692	$ -	$ 65,692
90109	7.1.3 Waterloo Regional Voice Radio System Upgrades	2014	$ 2,434,000	$ -	$ 2,434,000	$ 2,058,442	$ -	$ 375,558	$ 375,558	$ -	$ 375,558
		2015	$ 9,801,000	$ -	$ 9,801,000	$ 8,288,737	$ -	$ 1,512,263	$ 1,512,263	$ -	$ 1,512,263
		2016	$ 9,801,000	$ -	$ 9,801,000	$ 8,288,737	$ -	$ 1,512,263	$ 1,512,263	$ -	$ 1,512,263
90160	7.1.4 Admin Headquarters Expansion (DC hard services only)	2017	$ 510,000	$ -	$ 510,000	$ 484,500	$ -	$ 25,500	$ 25,500	$ -	$ 25,500
		2018	$ 5,610,000	$ -	$ 5,610,000	$ 5,329,500	$ -	$ 280,500	$ 280,500	$ -	$ 280,500
		2019	$ 13,260,000	$ -	$ 13,260,000	$ 12,597,000	$ -	$ 663,000	$ 663,000	$ -	$ 663,000
		2020	$ 15,300,000	$ -	$ 15,300,000	$ 14,535,000	$ -	$ 765,000	$ 765,000	$ -	$ 765,000
		2021	$ 6,120,000	$ -	$ 6,120,000	$ 5,814,000	$ -	$ 306,000	$ 306,000	$ -	$ 306,000
	TOTAL OPERATIONS AND FACILITIES		**$ 69,913,740**	**$ -**	**$ 69,913,740**	**$ 62,743,029**	**$ -**	**$ 7,170,711**	**$ 7,170,711** Lesser of (B) or (H)	**$ -**	**$ 7,170,711**

Residential Development Charge Calculation		
Residential Share of 2014-2023 Discounted Development-Related Capital Program	70%	$5,005,786
10 Year Growth in Population in New Units		105,151
Unadjusted Development Charge Per Capita ($)		**$47.61**
Non-Residential Development Charge Calculation		
Non-Residential Share of 2014-2023 Discounted Development-Related Capital Program	30%	$ 2,164,925
10 Year Growth in Square Meters		2,366,537
Unadjusted Development Charge Per m^2 ($)		**$0.91**

(A) 2013 - 2023 Discounted Funding Envelope = (J) on previous page	$ 10,031,833
Uncommitted Reserve Fund Balance as at Dec 31, 2013	$ 1,900,852
(B) Adjusted 2014 - 2013 Funding Envelope	$ 10,031,833

APPENDIX B.7
TABLE 3 - PAGE 1

REGION OF WATERLOO
CASHFLOW AND DETERMINATION OF DEVELOPMENT CHARGE
OPERATIONS/FACILITIES
RESIDENTIAL DEVELOPMENT CHARGE

7.00 OPERATIONS AND FACILITIES

OPENING CASH BALANCE FROM APPLICABLE RESERVES	$1,326,962			**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**TOTAL**
OPENING CASH BALANCE ($000)				$1,327.0	$1,365.1	$676.4	($708.7)	($885.1)	($719.4)	($832.4)	($1,026.5)	($849.1)	($437.5)	
2014-2023 RESIDENTIAL FUNDING REQUIREMENTS														
7.00 OPERATIONS AND FACILITIES - current ($000) (1)				$292.1	$1,081.5	$1,774.8	$545.1	$216.9	$516.1	$606.6	$250.6	$5.4	$5.5	**$5,294.6**
REVENUE - current ($000)	Rate for 2014													
- Dev. Charge Receipts (2)	$36.40	Inflation:	2.0%	$283.9	$364.8	$403.7	$411.4	$427.7	$444.6	$462.2	$480.5	$455.7	$471.5	**$4,206.0**
	Balance:	Positive	Negative											
- Interest on Opening Balance	Rate:	3.5%	5.5%	$46.4	$47.8	$23.7	($39.0)	($48.7)	($39.6)	($45.8)	($56.5)	($46.7)	($24.1)	**($182.3)**
- Interest on In-year Transactions (excl.int.)	Rate:	3.5%	5.5%	($0.2)	($19.7)	($37.7)	($3.7)	$3.7	($2.0)	($4.0)	$4.0	$7.9	$8.2	**($43.5)**
TOTAL REVENUE ($000)				$330.1	$392.9	$389.7	$368.7	$382.7	$403.1	$412.5	$428.1	$416.9	$455.6	**$3,980.2**
CLOSING CASH BALANCE ($000)				$1,365.1	$676.4	($708.7)	($885.1)	($719.4)	($832.4)	($1,026.5)	($849.1)	($437.5)	$12.6	
OPERATIONS FACILITIES PER CAPITA CHARGE	**$36.40**													
(1) Based on residential funding requirements in constant $000 of				*$292.1*	*$1,060.3*	*$1,705.9*	*$513.7*	*$200.4*	*$467.4*	*$538.6*	*$218.2*	*$4.6*	*$4.6*	***$5,005.8***
(2) Based on population growth in new units of				*7,800*	*9,827*	*10,661*	*10,652*	*10,856*	*11,064*	*11,276*	*11,492*	*10,686*	*10,839*	***105,151***

APPENDIX B.7
TABLE 3 - PAGE 2

REGION OF WATERLOO
CASHFLOW AND DETERMINATION OF DEVELOPMENT CHARGE
OPERATIONS/FACILITIES
NON-RESIDENTIAL DEVELOPMENT CHARGE

7.00 OPERATIONS AND FACILITIES

OPENING CASH BALANCE FROM APPLICABLE RESERVES	$573,890			**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**TOTAL**
OPENING CASH BALANCE ($000)				$573.9	$581.4	$237.9	($396.6)	($476.7)	($398.4)	($441.2)	($516.8)	($426.4)	($213.0)	
2014-2023 NON-RESIDENTIAL FUNDING REQUIREMENTS														
7.00 OPERATIONS AND FACILITIES - current ($000) (1)				$126.3	$477.1	$782.9	$240.5	$95.7	$227.7	$267.6	$110.6	$2.4	$2.4	**$2,333.1**
REVENUE - current ($000)	Balance:													
- Dev. Charge Receipts (2)	$0.73	Inflation:	2.0%	$114.1	$122.9	$157.4	$183.7	$198.4	$207.3	$217.7	$227.3	$235.2	$245.7	**$1,909.7**
	Balance:	Positive	Negative											
- Interest on Opening Balance	Rate:	3.5%	5.5%	$20.1	$20.4	$8.3	($21.8)	($26.2)	($21.9)	($24.3)	($28.4)	($23.5)	($11.7)	**($109.0)**
- Interest on In-year Transactions (excl.int.)	Rate:	3.5%	5.5%	($0.3)	($9.7)	($17.2)	($1.6)	$1.8	($0.6)	($1.4)	$2.0	$4.1	$4.3	**($18.6)**
TOTAL REVENUE ($000)				$133.9	$133.5	$148.5	$160.3	$174.0	$184.8	$192.1	$200.9	$215.8	$238.2	**$1,782.1**
CLOSING CASH BALANCE ($000)				$581.4	$237.9	($396.6)	($476.7)	($398.4)	($441.2)	($516.8)	($426.4)	($213.0)	$22.9	
OPERATIONS FACILITIES CHARGE PER M^2	**$0.73**													
(1) Based on non-residential funding requirements in constant $000 of				*$126.3*	*$458.6*	*$737.8*	*$222.2*	*$86.7*	*$202.2*	*$232.9*	*$94.4*	*$2.0*	*$2.0*	***$2,164.9***
(2) Based on non-residential GFA growth in square metres of				*156,335*	*165,097*	*207,257*	*237,141*	*251,116*	*257,167*	*264,815*	*271,036*	*274,962*	*281,611*	***2,366,537***

APPENDIX C

TRANSPORTATION TECHNICAL APPENDIX

APPENDIX C

TRANSPORTATION SERVICES
TECHNICAL APPENDIX

This appendix provides the analysis undertaken to establish the development charge rates for the Transportation service category. The service category includes all roads and related infrastructure related to a highway as defined in subsection 1 (1) of the *Municipal Act, 2001*, including the road network, bridges and culverts, streetlights, intersection improvements, traffic signalization, sidewalks, cycling lanes, transit priority measures, and other related structures.

The capital planning and management of all transportation infrastructure in the Region is carried out by the Transportation Division of the Transportation and Environmental Services Department. The basis of the development-related capital program for Transportation infrastructure is the Region's recently approved 2014 10-year capital program as well as discussions with Regional staff and consultants from Dillon Consulting Ltd. A report on Dillon's analysis of the development-related capital program is provided in Appendix G.

The projects identified in the capital program are required to service the demands of new development between 2014 and 2023, subject to annual capital budget reviews. Consistent with s. 5. (1)7. of the *Development Charges Act* (*DCA*), there is no legislated percentage reduction in the eligible development-related capital cost for the provision of Transportation infrastructure.

The analysis in this appendix is displayed in four sets of tables:

Table 1	Historic Service Levels
Table 2	Level-of-Service Summary from Transportation Modelling
Table 3	Development-Related Capital Program
Table 4	Development Charge Calculation

The tables provide the background data and analysis undertaken to arrive at the calculated development charge rates. An overview of the content and purpose of each of the tables is given below.

TABLE 1 HISTORICAL SERVICE LEVELS

The *DCA* and *Ontario Regulation 82/98* require that development charges be set at a level no higher than the average service level provided in the Region over the 10 year period immediately preceding the preparation of the background study, on a service by service basis. For the purpose of this study, the historical inventory period has been defined as 2004 to 2013. *O. Reg. 82/98* requires that when defining and determining historic service levels both the quantity and quality of service be taken into consideration.

In keeping with the Region's *2009 Development Charge Background Study*, two methods for establishing the historical service level for Transportation have been employed. The first method expresses the service level as a $ per capita and employment based on a valuation of the inventory of capital assets used to provide the Transportation service. The quantum and value of the inventory is based on the Region's historical records and experience with costs to acquire or construct similar infrastructure. The second method employs an analysis of historical and forecast traffic flows in the Region as prepared by Dillon Consulting. The second method is summarized in Table 2. The first method is discussed below.

Table 1, page 1, demonstrates that the Region's current road infrastructure comprises 705 centre lane km of roads with a current replacement value estimated at $1.49 billion. The land associated with the road network (2,005 hectares), as well as sidewalks, multi-use trails, roundabouts, bridges and culverts, transportation studies, traffic signals, illumination, and other non-roads capital assets add another $2.32 billion to the value of the inventory (page 2). The 2013 full replacement value of the inventory of capital assets for the Transportation service exceeds $3.81 billion.

Table 1, page 3, summarizes the ten year replacement value of the Region's Transportation infrastructure and shows the calculation of the ten year historical average service level. As shown, the ten year historical average service level is calculated to be $4,680 per capita plus employment.

The bottom portion of Table 1, page 3, shows the calculation of the "maximum allowable" funding envelope for Transportation infrastructure. The maximum allowable is defined as the ten year historical service level ($4,680 per capita and

employment) multiplied by the forecast increase in net population and employment over the planning period (141,045 persons and jobs). The resulting maximum allowable funding envelope of $660.1 million is the value of capital infrastructure that would have to be constructed over the 2014-2023 period so that the ten year historical service level for Transportation is maintained.

TABLE 2 LEVEL OF SERVICE FROM TRANSPORTATION MODELLING

The analysis of the Region's historical ten-year and forecast Transportation service level has also been examined based on a transportation analysis prepared by Dillon Consulting. The results of that level of service analysis are summarized in Table 2 and Appendix G.

The system level of service analysis is undertaken to ensure that the planned infrastructure improvements incorporated in the 2014-2023 capital program do not result in a system performance improvement beyond that which has been attained in the Region over the historical ten-year period.

Table 2 shows that the average network service level expressed in terms of daily vehicle km per lane km has worsened over the ten year historical period, increasing from 3,221 vehicle km per lane km in 2004 to 4,203 vehicle km per lane km in 2013. Over the ten-year period the average level of service totalled about 3,712 vehicle km per lane km. The service level as measured by total lane km per capita and employment has also worsened over the ten year historical period, falling from 2.27 km per 1,000 pop/emp in 2004 to 2.06 lane km per 1,000 pop/emp in 2013. Over the ten-year period the average level of service was 2.17 lane km per 1,000 pop/emp.

The forecast level of service analysis for daily vehicle km per lane km to 2021 was prepared using the Waterloo Regional Transportation (WRT) model. The travel demand modelling was based on the existing and future population and employment allocations by traffic zone as used in the *Regional Transportation Master Plan 2010*. Although the modelling extends to 2031, with an interim model run prepared for 2021 as part of the Dillon analysis, the conclusions that can be drawn are not materially affected. Using the calibrated WRT model shows that if the forecast increase in travel demands were to be accommodated on the proposed 2021 Regional road network, including additions and improvements incorporated in the 2014-2023

development-related capital program included in this study (see Table 3 below), the service level would worsen to about 4,018 vehicle km per lane km, an increase of approximately 8% over the historical ten-year service level.

In terms of lane km per capita and employment the service level would also decrease by the end of the 10 year planning period (2023), to 1.79 km per 1,000 pop/emp or 17.3% less than the historical average.

By these service level measures, all of the 2014-2023 network improvements and additions can be considered development-related. In fact, while it could be concluded that significant additional roadway improvements could be warranted, the Region's longer-term transportation strategy addresses this issue through conventional and rapid transit oriented infrastructure improvements.

TABLE 3 DEVELOPMENT-RELATED CAPITAL PROGRAM

The *DCA* requires that Regional Council express its intent to provide future capital facilities at the level incorporated in the development charges calculation. Based on the Council approved 2014 capital budget and nine year capital forecast, a development-related capital program which sets out those projects that are required to service anticipated growth for the ten year period from 2014 to 2023 has been prepared. Details on capital cost estimates, timing of construction, and descriptions of individual projects are provided in Appendix G and on the following pages of Table 3:

Page 1	Development-related intersection improvements and roundabouts
Page 2	Development-related turning lanes and new traffic signal installations
Pages 3-4	Road widenings
Page 5	New road links and studies
Pages 6-7	New cycling lanes
Pages 8-9	New sidewalks constructed with development-related road works
Page 10	New sidewalks constructed as separate projects

Capital costs have been allocated as development-related or non-development related (the "benefit to existing" share) based on the demands of new development on the particular project and need to improve the transportation network to accommodate the development-related impacts. The allocations are very similar to those used in the Region's *2009 Development Charges Background Study*. Generally:

- projects which add capacity to the network (system expansion projects; new turning lanes; road widenings) are considered for the most part to be 100% development-related since the level-of-service in the network after undertaking these projects will be lower than the 10-year historic average service level. For some road widenings, where a portion of the project cost relates to the resurfacing or reconstruction of existing road segments that may require improvements even in the absence of growth, a non-development or benefit to existing share of 15% has been identified based on the estimated cost of resurfacing the existing segment.

- traffic signal installation and intersection improvements associated with projects which add capacity to the road network are deemed to be 100% development-related. For intersection improvements where the reconstruction or widening of existing intersections is required to accommodate development, a non-development share of 50% has been assigned.

- new cycling lane and sidewalk projects that are on regional roads and serve a long distance corridor function connecting areas of new development with destinations such as the universities/colleges and downtown areas. These projects are required in order for the Region to achieve the mode share targets identified in the RTMP for active transportation as well as manage the overall growth in travel demand. Most of the new cycling and sidewalk lanes included in the development-related capital program are those that are associated with road expansion projects. As such, they are treated as 100% development-related (they were previously treated as 16% development-related in the 2009 Background Study). New cycling lanes and sidewalks that represent a local improvement to existing residents have not been included in the program.

- transit priority measures that provide travel capacity improvements within the existing road network through queue jumps, signal priority measures, enhanced stops, mini-terminals and associated Intelligent Transportation System (ITS) investments are considered to be 100% development-related.

- a development-related share of 55% used in the 2009 Background Study for a $27.8 million grade separation project (#5441, scheduled for 2014-2015) has been maintained.

The total cost of the Transportation development-related capital program is nearly $523.7 million (page 11). Approximately $23.6 million of the total cost (5%) has been identified as a non-growth share. The remaining $500.1 million is related to development in the Region and can be recovered through development charges. The development-related capital cost to be recovered is less than the eligible maximum

allowable funding envelope of $660.1 million shown in Table 1. This further confirms the level-of-service analysis summarized in Table 2 which shows an anticipated deterioration in the road service level over the forecast period.

TABLE 4 CALCULATION OF DEVELOPMENT CHARGE

The first step in the determination of the development charge rate is the allocation of the development charge eligible capital cost of $500.1 million between the residential and the non-residential sectors. For Transportation the development-related costs have been allocated 70% residential ($349.1 million) and 30% non-residential ($151.0 million). This ratio is based on forecast growth in population in new housing units (105,551) and employment in new non-residential floorspace (45,476) over the planning period.

A cashflow analysis (shown in Table 4) is also undertaken to account for the timing of projects and receipt of development charges. Interest earnings or borrowing costs are, therefore, accounted for in the calculation as allowed under the *DCA*. Based on the development forecast, the analysis calculates the development charge rate that is required to finance the net development-related capital spending plan including provisions for any borrowing costs or interest earnings on the reserve funds. The residential rate is expressed as a development charge per capita (Table 4, page 1). The non-residential rate is expressed as a development charge per square metre of gross floor area (Table 4, page 2).

The cashflow analysis is designed so that the closing cash balance at the end of the planning period is as close to nil as possible. Existing Transportation development charge reserve funds that are available to fund the development-related capital program are accounted for as opening balances in the cashflow. In order to determine appropriate development charge rates reflecting borrowing and earnings necessary to support the net development-related funding requirement, assumptions are used for the inflation rate and interest rate. An annual inflation rate of 2.0 per cent is used for the funding requirements and interest rates of 5.5 per cent (negative balance) and 3.5 per cent (positive balance) are assumed for borrowing/earnings on the funds. This yields effective real discount rates of 3.5 per cent and 1.5 per cent respectively.

As shown in Table 4, pages 1-2 the development-related capital program and forecasted growth result in Transportation development charges of $3,179.80 per capita for new residential development and of $61.76 per square metre for new non-residential development.

The following is a summary of the Transportation development charge rate calculation:

Service	Development-Related Capital Program ($000)		Calculated Development Charge	
	Total 2014-2023	Dev. Charge Recoverable	Residential ($/capita)	Non-Residential ($/m^2)
Transportation	**$523,682**	**$500,069**	**$3,165.60**	**$61.48**

APPENDIX C
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REGION OF WATERLOO
2014 DEVELOPMENT CHARGES STUDY
INVENTORY OF CAPITAL ASSETS - TRANSPORTATION INFRASTRUCTURE

ROADS	Centre Lane (in km) 2004	Centre Lane (in km) 2005	Centre Lane (in km) 2006	Centre Lane (in km) 2007	Centre Lane (in km) 2008	Centre Lane (in km) 2009	Centre Lane (in km) 2010	Centre Lane (in km) 2011	Centre Lane (in km) 2012	Centre Lane (in km) 2013	New Construction 2013 Costs per Centre Lane km ($)
Arterials - Rural											
2 lane	407.8	410.2	408.6	406.4	392.2	409.7	405.6	405.0	402.8	402.8	$1,490,000
3 lane						0.0	0.0	0.0	0.0	0.0	$1,770,000
4 lane	4.2	4.2	4.2	4.2	4.2	3.6	3.3	3.7	1.8	1.8	$2,075,000
2 lane + bike lane	9.6	9.6	12.4	15.5	29.8	13.5	16.9	17.1	13.4	13.4	$1,585,000
4 lane + bike lane									0.7	0.7	$2,205,000
Arterials - Urban											
1 lane	1.9	1.9	1.9	1.9	1.9	1.6	1.6	1.6	1.6	1.6	$2,325,000
2 lane	118.9	117.8	115.5	112.0	111.6	109.8	114.6	114.4	115.9	115.6	$2,645,000
3 lane	11.0	11.0	11.0	11.0	11.0	9.7	7.8	6.7	6.7	6.7	$2,965,000
4 lane	104.8	103.5	101.9	99.4	98.9	99.5	101.3	99.5	101.7	101.7	$3,285,000
5 lane	6.6	6.6	6.6	6.6	6.6	7.1	6.3	6.0	6.0	6.0	$3,605,000
6 lane	3.6	3.6	3.6	3.6	3.6	3.6	4.1	3.9	3.9	3.9	$3,920,000
2 lane + bike lane	13.4	14.5	16.8	19.3	19.3	20.1	22.9	21.0	22.0	22.4	$2,895,000
3 lane + bike lane	0.5	0.5	0.5	0.5	0.5	1.1	1.1	2.7	3.4	3.4	$3,245,000
4 lane + bike lane	9.7	11.1	13.0	17.7	18.2	18.4	18.4	22.0	25.0	25.0	$3,595,000
6 lane + bike lane	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	$4,290,000
Total Centre Lane (km)	**692.0**	**694.5**	**696.0**	**698.1**	**698.1**	**697.6**	**703.8**	**703.3**	**704.8**	**705.0**	
Total ($000)	**$1,440,561.6**	**$1,445,175.1**	**$1,449,378.6**	**$1,457,499.9**	**$1,459,653.3**	**$1,456,454.3**	**$1,475,152.8**	**$1,476,085.5**	**$1,492,157.4**	**$1,492,795.5**	

LAND	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2013 UNIT COST
Total (acres)	4,865.0	4,882.6	4,893.1	4,907.5	4,907.5	4,904.4	4,947.7	4,944.6	4,955.1	4,955.1	$300,000
Total (hectares)	1,968.9	1,976.0	1,980.2	1,986.1	1,986.1	1,984.8	2,002.3	2,001.1	2,005.3	2,005.3	
Total ($000)	**$1,459,502.7**	**$1,464,775.5**	**$1,467,939.2**	**$1,472,262.8**	**$1,472,262.8**	**$1,471,313.7**	**$1,484,305.8**	**$1,483,388.4**	**$1,486,524.6**	**$1,486,530.0**	

SIDEWALKS	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2013 UNIT COST
Total (linear km)	335.1	335.1	335.1	331.1	332.0	340.1	343.2	346.3	359.0	360.0	$313,380
Total ($000)	**$ 105,013.6**	**$ 105,013.6**	**$ 105,013.6**	**$ 103,747.9**	**$ 104,055.0**	**$ 106,579.6**	**$ 107,541.0**	**$ 108,513.2**	**$ 112,490.9**	**$ 112,816.8**	

MULTI-USE TRAILS	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2013 UNIT COST
Total (m^2)	14,377	24,782	24,782	31,426	31,702	48,578	54,298	54,298	62,192	63,902	$35
Total ($000)	**$503.2**	**$867.4**	**$867.4**	**$1,099.9**	**$1,109.6**	**$1,700.2**	**$1,900.4**	**$1,900.4**	**$2,176.7**	**$2,236.6**	

ROUNDABOUTS (Total #)	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2013 UNIT COST
1 lane				1	3	3	3	3	3	3	$1,100,000
2 lane		3	3	5	8	8	10	12	13	14	$2,000,000
3 lane									1	1	$2,500,000
Total ($000)	**$0.0**	**$6,000.0**	**$6,000.0**	**$11,100.0**	**$19,300.0**	**$19,300.0**	**$23,300.0**	**$27,300.0**	**$31,800.0**	**$33,800.0**	

BRIDGES AND CULVERTS (area in m^2)	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2013 UNIT COST
Bridges-Rigid	8,268	8,428	8,681	8,681	8,431	8,431	8,431	8,431	8,273	9,102	$9,206
Bridges-Arch Major	4,385	4,528	4,528	4,528	4,528	4,528	4,528	4,528	4,528	4,640	$10,285
Bridges-Girder	42,480	42,662	42,662	43,118	43,620	43,620	43,620	43,620	44,517	50,902	$7,546
Culverts-Rigid	3,374	3,374	3,374	3,637	3,438	3,438	4,027	4,027	4,384	7,779	$9,206
Culverts-CSP Major	430	430	430	430	430	430	1,638	1,898	1,898	1,898	$1,034
Culverts-Arch Minor	765	765	765	765	765	765	765	765	765	1,320	$9,206
Total (area in m^2)	**59,702**	**60,187**	**60,440**	**61,159**	**61,212**	**61,212**	**63,009**	**63,269**	**64,365**	**75,641**	
Total ($000)	**$480,317.3**	**$484,634.4**	**$486,963.5**	**$492,825.6**	**$492,480.2**	**$492,480.2**	**$499,151.6**	**$499,420.5**	**$508,021.2**	**$601,349.8**	

APPENDIX C
TABLE 1 - PAGE 2

REGION OF WATERLOO
2014 DEVELOPMENT CHARGES STUDY
INVENTORY OF CAPITAL ASSETS

STUDIES & RELATED PROJECTS ($)	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
06697 Kitchener West Side Connection Study										
North/South Arterial Study										
07058 Cambridge Transportation Study	$50,600	$7,529	$31,710							
07066 Transportation Master Plan (roads component)	$63,819	$69,114	$52,027	$128,297	$541,000	$326,000	$140,500	$158,000	$87,500	$50,000
Transportation Tomorrow Survey										
07072 Cycling Master Plan Study	$2,155									
07074 Growth Related Transportation Study	$39,945	$24,955	$44,886	$70,964	$129,000	$207,000	$179,000	$243,000	$280,000	$280,000
07127 Active Transportation Master Plan										$35,000
07178 Roundabout Education Program			$41,083	$27,741	$65,000	$65,000	$150,000	$155,000	$60,000	$50,000
07227 Transportation Urban Design Guidelines					$150,000	$196,000	$32,000			
07298 Commuter Parking Lot Feasibility Study										$75,000
07304 Goods Movement Study									$100,000	$100,000
7255 Ped Bridge Crossing 401 Feasibiilty Study						$70,000	$21,000	$24,000		
07268 Homer Watson Blvd. New Dundee to Manitour Trans. Review										$75,000
07299 East Boundary Corridor Protection Study								$50,000	$198,000	$500,000
07253 Growth Related Land Dedication and Surveys						$100,000	$100,000	$100,000	$100,000	$110,000
07302 Transportation and Transit Forecast Model (roads share)								$50,000	$125,000	$245,000
Various EA and Planning Studies	$2,000,000	$2,000,000	$2,000,000	$2,000,000	$2,000,000	$2,000,000	$2,000,000	$2,000,000	$2,000,000	$2,000,000
Total ($000)	**$2,156.5**	**$2,101.6**	**$2,169.7**	**$2,227.0**	**$2,885.0**	**$2,964.0**	**$2,622.5**	**$2,780.0**	**$2,950.5**	**$3,520.0**

TRAFFIC SIGNALS [1]	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2013 UNIT COST
Intersection Signals	422	427	432	439	440	450	451	450	453	452	
Intesection Pedestrian Signals	11	12	12	12	13	13	14	15	15	15	
Midblock Pedestrian Signals	11	11	11	11	12	14	14	14	14	26	
Total (#)	444	450	455	462	465	477	479	479	482	493	
Total ($000)	**$31,080.0**	**$31,500.0**	**$31,850.0**	**$32,340.0**	**$32,550.0**	**$33,390.0**	**$33,530.0**	**$33,530.0**	**$33,740.0**	**$34,510.0**	$70,000

ILLUMINATION [2]	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2013 UNIT COST
Total (#)	**7,511**	**7,552**	**7,420**	**7,805**	**7,861**	**7,944**	**7,982**	**7,897**	**8,031**	**8,106**	
Total ($000)	**$15,022.0**	**$15,104.0**	**$14,840.0**	**$15,610.0**	**$15,722.0**	**$15,888.0**	**$15,964.0**	**$15,794.0**	**$16,062.0**	**$16,212.0**	$2,000

OTHER ITEMS:	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2012 UNIT COST
Stormwater Management Ponds											
Total (m^2)	**22,171**	**22,171**	**22,171**	**62,433**	**62,433**	**62,433**	**62,433**	**62,433**	**62,433**	**62,433**	
Total ($000)	**$161.3**	**$864.7**	**$864.7**	**$864.7**	**$2,434.9**	**$2,434.9**	**$2,434.9**	**$2,434.9**	**$2,434.9**	**$2,434.9**	$39
Guide Rails											
Total (length in m)	**31295**	**31,295**	**67,880**	**67,880**	**67,880**	**69,637**	**69,637**	**69,760**	**70,823**	**71,455**	
Total ($000)	**$1,158.8**	**$1,158.8**	**$2,540.3**	**$2,540.3**	**$2,540.3**	**$2,606.1**	**$2,576.6**	**$2,581.1**	**$2,620.5**	**$2,643.8**	$37
Retaining Walls											
Total (m^2)	**12,222**	**12,222**	**12,222**	**12,222**	**12,222**	**13,137**	**13,137**	**12,281**	**12,742**	**13,001**	
Total ($000)	**$5,720.0**	**$5,720.0**	**$5,720.0**	**$5,720.0**	**$5,720.0**	**$6,148.2**	**$6,148.1**	**$5,747.5**	**$5,963.3**	**$6,084.5**	$468
Noise Walls											
Total (length in m)	**6,376**	**14,090**	**14,090**	**14,090**	**14,090**	**14,090**	**14,521**	**14,521**	**15,096**	**15,374**	
Total ($000)	**$6,376.0**	**$14,090.0**	**$14,090.0**	**$14,090.0**	**$14,090.0**	**$14,090.0**	**$15,610.1**	**$15,610.1**	**$16,228.2**	**$16,527.1**	$1,075
Oil Water Separators											
Total (#)	**4**	**5**	**16**	**19**	**21**	**23**	**27**	**31**	**31**	**31**	
Total ($000)	**$146.1**	**$188.0**	**$552.5**	**$655.3**	**$760.7**	**$833.2**	**$978.1**	**$1,123.0**	**$1,123.0**	**$1,123.0**	$36,226

NON-ROADS CAPITAL INVESTMENT ($000)	**$2,107,157.6**	**$2,132,018.0**	**$2,139,410.9**	**$2,155,083.6**	**$2,165,910.5**	**$2,169,728.2**	**$2,196,063.2**	**$2,200,123.1**	**$2,222,135.8**	**$2,319,788.5**
ROADS CAPITAL INVESTMENT ($000)	**$1,440,561.6**	**$1,445,175.1**	**$1,449,378.6**	**$1,457,499.9**	**$1,459,653.3**	**$1,456,454.3**	**$1,475,152.8**	**$1,476,085.5**	**$1,492,157.4**	**$1,492,795.5**
TOTAL CAPITAL INVESTMENT ($000)	**$3,547,719.2**	**$3,577,193.1**	**$3,588,789.5**	**$3,612,583.5**	**$3,625,563.8**	**$3,626,182.5**	**$3,671,216.0**	**$3,676,208.6**	**$3,714,293.1**	**$3,812,584.0**

APPENDIX C
TABLE 1 - PAGE 3

REGION OF WATERLOO
2014 DEVELOPMENT CHARGES BACKGROUND STUDY
CALCULATION OF SERVICE LEVELS AND MAXIMUM ALLOWABLE DC

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Historic Population	479036	488470	497081	504140.5	511511	516303.5	521108.5	531704.5	538303	543733.1
Historic Employment	247,380	252,820	259,310	263,890	266,430	257,110	268,490	276,240	286,630	291,440
Total Population & Employment	**726,416**	**741,290**	**756,391**	**768,031**	**777,941**	**773,414**	**789,599**	**807,945**	**824,933**	**835,173**

INVENTORY SUMMARY ($000)

Roads	$1,440,562	$1,445,175	$1,449,379	$1,457,500	$1,459,653	$1,456,454	$1,475,153	$1,476,086	$1,492,157	$1,492,796
Land	$1,459,503	$1,464,776	$1,467,939	$1,472,263	$1,472,263	$1,471,314	$1,484,306	$1,483,388	$1,486,525	$1,486,530
Sidewalks	$105,014	$105,014	$105,014	$103,748	$104,055	$106,580	$107,541	$108,513	$112,491	$112,817
Multi-Use Trails	$503	$867	$867	$1,100	$1,110	$1,700	$1,900	$1,900	$2,177	$2,237
Roundabouts	$0	$6,000	$6,000	$11,100	$19,300	$19,300	$23,300	$27,300	$31,800	$33,800
Bridges & Culverts	$480,317	$484,634	$486,963	$492,826	$492,480	$492,480	$499,152	$499,420	$508,021	$601,350
Studies and Related Projects	$2,157	$2,102	$2,170	$2,227	$2,885	$2,964	$2,623	$2,780	$2,951	$3,520
Traffic Signals	$31,080	$31,500	$31,850	$32,340	$32,550	$33,390	$33,530	$33,530	$33,740	$34,510
Illumination	$15,022	$15,104	$14,840	$15,610	$15,722	$15,888	$15,964	$15,794	$16,062	$16,212
Other Transportation Items	$14,864	$24,136	$26,049	$26,162	$27,998	$28,619	$30,412	$30,136	$31,093	$31,579
Total ($000)	**$3,549,021**	**$3,579,307**	**$3,591,071**	**$3,614,875**	**$3,628,016**	**$3,628,689**	**$3,673,880**	**$3,678,848**	**$3,717,017**	**$3,815,350**

SERVICE LEVEL ($/capita & employment)

											10 Year Average Service Level
Roads	$1,983.11	$1,949.54	$1,916.18	$1,897.71	$1,876.30	$1,883.15	$1,868.23	$1,826.96	$1,808.82	$1,787.41	$1,879.74
Land	$2,009.18	$1,975.98	$1,940.71	$1,916.93	$1,892.51	$1,902.36	$1,879.82	$1,836.00	$1,801.99	$1,779.91	$1,893.54
Sidewalks	$144.56	$141.66	$138.84	$135.08	$133.76	$137.80	$136.20	$134.31	$136.36	$135.08	$137.37
Multi-Use Trails	$0.69	$1.17	$1.15	$1.43	$1.43	$2.20	$2.41	$2.35	$2.64	$2.68	$1.81
Roundabouts	$0.00	$8.09	$7.93	$14.45	$24.81	$24.95	$29.51	$33.79	$38.55	$40.47	$22.26
Bridges & Culverts	$661.22	$653.77	$643.80	$641.67	$633.06	$636.76	$632.16	$618.14	$615.83	$720.03	$645.64
Studies and Related Projects	$2.97	$2.84	$2.87	$2.90	$3.71	$3.83	$3.32	$3.44	$3.58	$4.21	$3.37
Traffic Signals	$42.79	$42.49	$42.11	$42.11	$41.84	$43.17	$42.46	$41.50	$40.90	$41.32	$42.07
Illumination	$20.68	$20.38	$19.62	$20.32	$20.21	$20.54	$20.22	$19.55	$19.47	$19.41	$20.04
Other Transportation Items	$20.46	$32.56	$34.44	$34.06	$35.99	$37.00	$38.52	$37.30	$37.69	$37.81	$34.58
Total ($/capita & employment)	**$4,885.66**	**$4,828.48**	**$4,747.64**	**$4,706.68**	**$4,663.61**	**$4,691.78**	**$4,652.85**	**$4,553.34**	**$4,505.84**	**$4,568.33**	**$4,680.42**

CALCULATION OF MAXIMUM ALLOWABLE DC
TRASNPORTATION INFRASTRUCTURE

10-Year Funding Envelope Calculation		
10 Year Average Service Level 2004 - 2013	$4,680.42	(A)
Net Population & Employment Growth in Region 2014 - 2023	141,045	(B)
Maximum Allowable Funding Envelope	$660,148,412	(C) = (A) x (B)
Less: Uncommitted Excess Capacity	$0	(D)
Less: 10% Legislated Reduction	$0	(E) = ((C) - (D)) * 10%
Discounted Maximum Allowable Funding Envelope	**$660,148,412**	(F) = (C) - (D) - (E)

APPENDIX C
TABLE 2

REGION OF WATERLOO
2014 DEVELOPMENT CHARGES STUDY
NETWORK LEVEL-OF-SERVICE SUMMARY

Level of Service Measure #1	
Year	**Daily Vehicles per Lane**
2004	3,221
2005	3,372
2006	3,401
2007	3,352
2008	3,854
2009	3,835
2010	3,840
2011	3,994
2012	4,051
2013	4,203
10-year average	**3,712**
Regional Transportation Model Assigned 2021 Volume on 2021 Road Network	**4,018**
% Change Over Historical Average With Proposed Road Network	**8%**

Level of Service Measure #2	
Year	**Lane km/1,000 pop and emp**
2004	2.27
2005	2.26
2006	2.21
2007	2.20
2008	2.16
2009	2.18
2010	2.15
2011	2.10
2012	2.07
2013	2.06
10-year average	**2.17**
Projected Lane Km per 1,000 Pop/Emp in 2023	**1.79**
% Change Over Historical Average With Proposed Road Network	**-17.3%**

Source: *Transportation and Transit DC Study,* Dillon Consulting, 2014.

APPENDIX C
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REGION OF WATERLOO
2014 DEVELOPMENT CHARGES BACKGROUND STUDY
DEVELOPMENT-RELATED CAPITAL FORECAST

TRANSPORTATION INFRASTRUCTURE

($000)

			2014		2015		2016		2017		2018		2019		2020		2021		2022		2023		TOTAL		
PROJ. NO.	DEV-RELATED %	PROJECT DESCRIPTION	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Total
		INTERSECTION IMPROVEMENTS (DEVELOPMENT-RELATED)																							
5003	100%	Reg Rd 9 Erbs Street at Wilmot Line										50		300		200		200		1,500		100		2,350	2,350
5284	100%	RR12&58,New Dundee at Fischer Hallman		50		100		200		1,100														1,450	1,450
5334	55%	RR24 Hespeler Rd at RR N of Dundas	1,215	1,485																			1,215	1,485	2,700
5389	85%	RR9(Erb) Caroline to Menno	182	1,029	172	973																	353	2,002	2,355
5441	55%	RR15(King)GEXR Crossing-Subway Installatlion	8,010	9,790	4,500	5,500																	12,510	15,290	27,800
5602	100%	RR#6 (Highland) at Lawrence and Belmont		190																				190	190
7042	100%	RR#15(King)at Waterloo Inn to Bluespring		530		50																		580	580
7090	100%	RR 50and09 Westmount at Erb						10		210		10												230	230
7145	100%	RR#56 (Bleams) at FischerHallman		745		1,075		500		3,350														5,670	5,670
7178	50%	Roundabout Education Program	48	48	25	25																	73	73	145
7186	50%	RR86(Church) at Barnswallow to E. of Rai	88	88																			88	88	175
7197	100%	RR39(Pinebush) at Townline (RR53)		100		150		450																700	700
7216	100%	RR15(King) at Conestoga Rd		20		250																		270	270
7217	100%	RR15(King) at Bridge St										25		300										325	325
7246	100%	RR#6&8 Frederick at Weber								150		200												350	350
7247	100%	RR#8 (Weber) at Glen Forrest								20		100		150										270	270
7248	100%	RR#17&26 Sawmill at St. Charles		50		40		150																240	240
7249	100%	RR#29 (Lancaster) at Elizabeth														20		100		150				270	270
7252	100%	RR#75 (St. Andrews)at Grand Ridge, 4th,S		20		200		400																620	620
7256	100%	Roundabouts to be Identified												1,800		1,800		1,800		1,800		1,800		9,000	9,000
7272	100%	RR #4 & #70, Ottawa at Trussler		20																				20	20
7278	100%	RR9(Erb St) at Beechwood Place								25		130												155	155
7279	100%	RR28&69 Homer Watson at Manintou				100		100		100		2,000												2,300	2,300
7283	100%	RR29 (Lancaster) at Louisa														20		100		130				250	250
7286	100%	RR#4 (Ottawa) at Hickson				40		150																190	190
7294	100%	RR4(Ottawa St)Homer Watson to Alpine		635		300		6,030																6,965	6,965
7315	100%	RR12 (New Dundee Rd) at Strasburg												2,000										2,000	2,000
7316	100%	RR 22 (Northfield Dr) King to Kraus		650		600		150																1,400	1,400
7317	100%	RR 50 (Westmount Rd) at Laurelwood		1,175																				1,175	1,175
7318	100%	RR 53 (Fairway) at Lackner														50		50		1,550		75		1,725	1,725
7319	100%	RR 58 (Fischer-Hallman) at Columbia		270																				270	270
7321	100%	RR 70 (Erbsville) at Columbia		690																				690	690
7322	100%	RR58 (Fischer-Hallman Rd) at Sienna St		440																				440	440
7332	85%	RR4 (Ottawa St) King St (RR15) to Charles St (RR64)	4	21	8	43	300	1,700	750	4,250	150	850											1,211	6,864	8,075
		TOTAL DEVELOPMENT-RELATED INTERSECTION IMPROVEMENTS	9,545	18,045	4,704	9,446	300	9,840	750	9,205	150	3,365		4,550		2,090		2,250		5,130		1,975	15,450	65,896	81,345

APPENDIX C
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REGION OF WATERLOO
2014 DEVELOPMENT CHARGES BACKGROUND STUDY
DEVELOPMENT-RELATED CAPITAL FORECAST

TRANSPORTATION INFRASTRUCTURE

($000)

			2014		2015		2016		2017		2018		2019		2020		2021		2022		2023		TOTAL		
PROJ. NO.	DEV-RELATED %	PROJECT DESCRIPTION	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Total
		DEVELOPMENT RELATED TURN LANES																							
5291	50%	Courtland Ave at Hayward Ave			25	25	100	100	323	323													448	448	895
7097	100%	Development Turn Lanes to be Identified												1,200		1,200		1,200		1,200		1,200		6,000	6,000
7165	100%	RR28&56 HomerWatson at Bleams														50		150		250				450	450
7171	100%	RR53(Courtland)at Blockline		1,600																				1,600	1,600
7173	100%	Dev Related Blvd & Shoulder Gradings		100		100		100		100		100		100		100		100		100		100		1,000	1,000
7180	100%	Pre and Post Construction-Expansion		100		100		100		100		100		100		100		100		100		100		1,000	1,000
7198	100%	RR58(Swan St) at Hilltop		10		10		100		180														300	300
7225	100%	RR56 (Bleams) at Nyles Rd														20		200						220	220
7280	100%	RR58 Northumberland at Ingles						50		150														200	200
7296	100%	RR12(New Dundee Rd) at Robert Ferrie/Rei		30																				30	30
7309	100%	RR28 (Fountain St) at Limerick Dr		10		30		20		100		20												180	180
7323	100%	RR4 (Ottawa St) at Westmount Rd (RR50)														5		35						40	40
7324	100%	RR4 (Ottawa St) at Howe Dr														5		50						55	55
7325	100%	RR8 (King St E) at Fairway Rd (RR53)						100		100														200	200
7326	100%	RR8 (King St E) at Weber St E (RR8)						100		145														245	245
7328	100%	RR39 (Eagle St) at Speedsville Ave										100		300										400	400
7329	100%	RR50&55 Westmount Rd at Victoria St						220																220	220
7331	100%	RR53 (Fairway Rd) at Wilson Ave								15		515		225										755	755
		TOTAL DEVELOPMENT RELATED TURN LANES		1,850	25	265	100	890	323	1,213		835		1,925		1,480		1,835		1,650		1,400	448	13,343	13,790

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REGION OF WATERLOO
#REF!
DEVELOPMENT-RELATED CAPITAL FORECAST

TRANSPORTATION INFRASTRUCTURE

($000)

			2014		2015		2016		2017		2018		2019		2020		2021		2022		2023		TOTAL		
PROJ. NO.	DEV-RELATED %	PROJECT DESCRIPTION	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Total
		NEW TRAFFIC SIGNAL INSTALLATIONS																							
9024	100%	Traffic Locations to be determined				200		200		200		200		200		200		200		200		200		1,800	1,800
9025	100%	Growth Related Traffic Signal Mod		15		25		25		25		25		25		25		25		25		25		240	240
9640	100%	RR53 Courtland at Block Line Rd		10																				10	10
9644	100%	RR6 (Highland Rd) at West Ave		80																				80	80
9645	100%	RR86 (Line 86) at Manser Rd (RR5)		50																				50	50
9551	100%	UPS Installations		35		35		35		35		35		35		35		35		35		35		350	350
9631	100%	LED Replacements		600		600																		1,200	1,200
9635	100%	Pedestrian Countdown Signal Upgrades		100		100		100																300	300
9256	100%	System Equip Reconfig Exp'n		350		155		155		155		155		155		155		155		155		155		1,745	1,745
9415	100%	Barrier Free Signals		25		25		25		25		25		25		25		25		25		25		250	250
9423	100%	Traffic Counter Measures		60		60		60		60		60		60		60		60		60		60		600	600
9582	100%	Central Traffic Control System		1,200																				1,200	1,200
		TOTAL NEW TRAFFIC SIGNAL INSTALLATIONS		2,525		1,200		600		500		500		500		500		500		500		500		7,825	7,825

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REGION OF WATERLOO
2014 DEVELOPMENT CHARGES BACKGROUND STUDY
DEVELOPMENT-RELATED CAPITAL FORECAST

TRANSPORTATION INFRASTRUCTURE

($000)

			2014		2015		2016		2017		2018		2019		2020		2021		2022		2023		TOTAL		
PROJ. NO.	DEV-RELATED %	PROJECT DESCRIPTION	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Total
		ROAD WIDENINGS																							
5110	100%	Victoria Street Edna to Bruce		1,460		50																		1,510	1,510
5204	85%	RR33(Townline) Avenue to Canamera Pkwy	69	391	80	451																	149	842	990
5337	85%	RR8(King) Eagle Fountain Shantz Hill	91	514	518	2,933	1,593	9,027	45	255													2,246	12,729	14,975
5340	85%	RR69 Manitou Dr Bleams to Fairway	251	1,420	878	4,973	66	374															1,194	6,766	7,960
5549	100%	RR36 Myers to Hwy 401		8,095		22,605		12,065		1,020		350		1,475		7,985		625						54,220	54,220
5616	100%	RR70(Trussler)Bleams to Hwy 7/8														200		200		100		100		600	600
5675	100%	RR#50 (Westmount) Fischer-Hallman to Blo										120		40		40		160		1,404		115		1,879	1,879
5709	100%	RR#58(Fischer-Hallman)Kit/Wat Bdry to Er										500		100		100		150		7,400		7,000		15,250	15,250
5752	100%	RR6(Highland)Eastforest Trail/Westheights to Trussler		250		100		300		300		5,765		365										7,080	7,080
7101	85%	RR8(Weber)Victoria to Guelph St	3,462	19,618	98	553																	3,560	20,171	23,730
7104	100%	RR#70(IraNeedles) Erbsville to Columbia														100		100		100		500		800	800
7111	100%	RR28(homer Watson) Doon to Conestoga Col		255		200		200		200		3,555		300										4,710	4,710
7116	100%	RR38(Maple Grove) Beaverdale to Fountain						565		500		200		500		6,085		550						8,400	8,400
7117	100%	RR#38(MapleGrove)Hespeler to Beaverdale										100		150		100		100		6,360		575		7,385	7,385
7121	100%	RR58(FischerHallman)Bleams to Activa		330		400		4,500		730														5,960	5,960
7122	100%	RR58 (Fischer Hallman) Huron to Bleams		870		500		185		2,300		100		9,180		800								13,935	13,935
7194	100%	RR#80 (Canamera) Conestoga to Franklin														100		100		100		200		500	500
7221	100%	RR58(Fischer-Hallman/Bearinger)Columbia						100		100		100		1,500		7,415		200						9,415	9,415
7226	100%	Hwy 8 Transit Bypass Lane		3,600																				3,600	3,600
7257	100%	RR22(Northfield Dr),Davenport to Univers		300		6,020		650																6,970	6,970
7258	100%	RR#56(Bleams)Fischer-Hallman to Strausburg		150		150		150		150		150		3,500		5,380		300						9,930	9,930
7259	100%	RR57 (University) Erb to Keatsway		195		100		100		500		2,000		1,500		300								4,695	4,695
7282	100%	RR 70 (Ira Needles) Highview to Erb		4,075				6,200																10,275	10,275
7284	100%	RR12 (New Dundee) Homer Watson to Fischer Hallman RD (RR5)												200		300		500		500		16,505		18,005	18,005
7297	85%	RR9(Erb St)Gateview Dr/Beechwood Dr to Erbsville Ct			30	170	30	170	30	170	386	2,189	26	149									503	2,848	3,350
7303	100%	RR17(Fountain St)Maplegrove to Kossuth		335		350		600		500		12,350		800										14,935	14,935
7313	100%	RR58(Fischer-Hallman Rd) Culvert upsizing		1,000																				1,000	1,000
7327	100%	RR9 (Erb St) Ira Needles Blvd to Wilmot Ln		100		100		100		100		2,700												3,100	3,100
		TOTAL REGIONAL ROAD WIDENINGS	3,872	42,958	1,602	39,653	1,689	35,286	75	6,825	386	30,179	26	19,759		28,905		2,985		15,964		24,995	7,651	247,508	255,159

APPENDIX C
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REGION OF WATERLOO
2014 DEVELOPMENT CHARGES BACKGROUND STUDY
DEVELOPMENT-RELATED CAPITAL FORECAST

TRANSPORTATION INFRASTRUCTURE

($000)

			2014		2015		2016		2017		2018		2019		2020		2021		2022		2023		TOTAL		
PROJ. NO.	DEV-RELATED %	NEW ROAD LINKS AND STUDIES	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Total
5274	100%	RR53(Fairway) Zeller to Fountain		1,300																				1,300	1,300
5349	100%	RR70(Ira Needles) Victoria to West Hill		60																				60	60
6433	100%	RR 24 Ainslie St Extension		70																				70	70
7066	100%	Transportation Master Plan		150		250																		400	400
7074	100%	Growth Related Transportation Study		225		100		100		100		100		100		100		100		100		100		1,125	1,125
7087	100%	Road 56 River Road Extension King to Wil		4,450		7,700		6,100		28,300		24,000		1,800										72,350	72,350
7127	50%	Active Transporation Master Plan	15	15																			15	15	30
7129	100%	S.Boundary Rd,Franklin to Dundas		840										30		500		2,855		12,355		400		16,980	16,980
7130	100%	RR4(Ottawa Ext)Keewatin to Forwell																		30		1,370		1,400	1,400
7131	100%	RR#17(Breslau ByPass)Victoria-1KMN Victo		30		30		40		40		3,620												3,760	3,760
7132	100%	RR36(Franklin)Myers to Camb SE Boundary		800		1,200		4,025		310														6,335	6,335
7192	100%	S.Boundary Rd, Water to Franklin		1,690		3,405		10,710		785														16,590	16,590
7253	100%	Growth Rel Land Dedication Surveys & Pur		100		100		100		100		100		100		100		100		100		100		1,000	1,000
7268	100%	RR12&28 New Dundee at Homer Watson		75																				75	75
7298	50%	Commuter Parking Lot Feasibility Study	25	25																			25	25	50
7299	100%	East Boundary Corridor Protection Study		690		100																		790	790
7301	100%	Road Improvement Transit Priority Strategy		150																				150	150
7302	100%	Transportation & Transit Forcasting Mode		195																				195	195
7304	50%	Goods Movement Study	25	25																			25	25	50
7305	100%	Highway 401 Interchange		50																				50	50
66069	100%	Install Transit Priority Measures		150		408																		558	558
66071	100%	ITS Technology Associated With Transit Priority Measures		317		317		317																950	950
		TOTAL NEW ROAD LINKS AND STUDIES	65	11,407		13,610		21,392		29,635		27,820		2,030		700		3,055		12,585		1,970	65	124,203	124,268

APPENDIX C
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REGION OF WATERLOO
2014 DEVELOPMENT CHARGES BACKGROUND STUDY
DEVELOPMENT-RELATED CAPITAL FORECAST

TRANSPORTATION INFRASTRUCTURE

($000)

			2014		2015		2016		2017		2018		2019		2020		2021		2022		2023		TOTAL		
PROJ. NO.	DEV-RELATED %	NEW CYCLING LANES	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Total
5041	100%	RR15(King)Victoria St RR55		5																				5	5
5170	100%	RR29(Lancaster) Union to Bridgeport																		360				360	360
5183	100%	RR52(Bridge) Kit/Wool Bdry to Bloomingda		400																				400	400
5377	100%	RR4 Ottawa St Mill to Homer Watson RR28										500												500	500
5378	100%	RR#5 (Hutchison) Lobsinger to Crosshill						200																200	200
5386	100%	RR8(Weber) Albert to Northfield												540										540	540
5387	100%	Reg Rd 8 (Weber) Columbia to King																				385		385	385
5390	100%	Reg Rd 9 (Erb) Fischer-Hallman to Erbsvi										120												120	120
5391	100%	RR15(King)Hwy 85 Ramp to Northfield				120																		120	120
5392	100%	RR17(Sawmill)Conestogo Bridge to Musselm								370														370	370
5393	100%	RR17(Fountain) King to Cherry Blossom						660																660	660
5404	100%	RR41(Bishop)Conestoga to Concession				1,035																		1,035	1,035
5407	100%	RR50 Northfield, King to Westmount		100																				100	100
5416	100%	(St Andrews) Cambridge BDRY to Grand Ave						1,360																1,360	1,360
5420	100%	RR97(Cedar) Osborne to Cambridge Brdy						775																775	775
5428	100%	RR6 (Snyders)0.9kmE of Notre Dame						115																115	115
5430	100%	RR 8 (Weber), Benjamin to King																		225				225	225
5431	100%	RR8 (King St) Printery Rd. To Sawmill Rd						250																250	250
5459	100%	RR#28 (Fountain St) Preston Pkwy to Dick								300														300	300
5471	100%	RR75(Sprague)Brant/Waterloo Brdy to Wri		380																				380	380
5489	100%	RR8(Weber)King to Milford		110																				110	110
5490	100%	RR9 (Erb) King to Caroline										45												45	45
5493	100%	RR12(NotreDame)HWY7/8 to Snyders						190																190	190
5495	100%	RR#17 (Sawmill) St. Charles to Snyder'sF						50																50	50
5497	100%	RR29(Lancaster) Victoria to Union																		5				5	5
5498	100%	RR#43 (Myers) Branchton to Franklin										550												550	550

APPENDIX C
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REGION OF WATERLOO
2014 DEVELOPMENT CHARGES BACKGROUND STUDY
DEVELOPMENT-RELATED CAPITAL FORECAST

TRANSPORTATION INFRASTRUCTURE

($000)

			2014		2015		2016		2017		2018		2019		2020		2021		2022		2023		TOTAL		
PROJ. NO.	DEV-RELATED %	NEW CYCLING LANES	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Total
5501	100%	RR57(University) Lincoln to Weber		340																				340	340
5565	100%	RR#4 (Ottawa) Weber to King St										235												235	235
5576	100%	RR52(Bridge) Woolwich to University												5										5	5
5579	100%	RR69(Manitou)HomerWatson to Bleams						300																300	300
5582	100%	RR77(Parkhill)Ainslie to Water						70																70	70
5636	100%	RR58(Swan)Hilltop to Stanley								1,090														1,090	1,090
5657	100%	RR#50 (Westmount) John to Erb								790														790	790
5671	100%	RR#30 (Shantz Stn) Kossuth to Menno								580														580	580
5675	100%	RR#50 (Westmount) Fischer-Hallman to Blo																		360				360	360
5680	100%	RR#4(Ottawa) Lackner to Old Chicopee								890														890	890
5681	100%	RR#4(Ottawa) Westmount to Fischer-Hallma																570						570	570
5682	100%	RR#5 (Nafziger) Gerber to Lawrence																				260		260	260
5683	100%	RR#5(Queen's Bush) Firella Brdg to Hutchi																				290		290	290
5687	100%	RR#9 (Erb) Menno to Westmount																				235		235	235
5688	100%	RR#10 (Herrgott) Lobsinger to St. Clemen																		5				5	5
5689	100%	RR#15(Lobsinger) Park to .8 km w Herrgot												120										120	120
5690	100%	RR#21 (Arthur) Whippoorwill to First																				385		385	385
5693	100%	RR#38 (Sportsworld) Gateway to King														175								175	175
5694	100%	RR#41 (Bishop) Concession to King																				280		280	280
5696	100%	RR#50 (Northfield) Weber to Waterloo/St.		375																				375	375
5697	100%	RR#53 (Fairway) Old Chicopee to River																795						795	795
5702	100%	RR#55 (Victoria) Lawrence to Westmount												955										955	955
5706	100%	RR#57 (University) Bridge to HW 85NB ram														350								350	350
5756	100%	RR1(Snyder's)Baden Water Tower Ent to Foundry										155												155	155
5796	100%	RR4(Ottawa St)Strasburg Rd to Westmount Rd(RR50)														350								350	350
5799	100%	RR23(Katherine St)Lundy Rd to Bridge#2301(Cox Creek)																		50				50	50
5800	100%	RR39(Eagle St)Concession Rd/Speedville Rd to King St W(RR8)																110						110	110
5923	100%	RR39(Pinebush) Townline Rd (RR33) to Franklin Blvd (RR36)																				905		905	905
5927	100%	RR17(Fountain St N)Cherry Blossom to Map										250												250	250
5933	100%	RR97(Main St E) Dundas St (RR8) to Chalmers St																		245				245	245
5984	100%	RR27(Samuelson/Clyde) Franklin Blvd to Beverly St												5										5	5
5985	100%	RR27(Beverly) Beverly/Samuelson to Dundas St												360										360	360
5988	100%	RR58(Fischer Hallman) Ottawa(RR4) to Forest Hill Dr																				45		45	45
6510	100%	RR9(Bridgeport) King to Erb										120												120	120
		TOTAL NEW CYCLING LANES		1,710		1,155		3,970		4,020		1,975		1,985		875		1,475		1,250		2,785		21,200	21,200

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REGION OF WATERLOO
2014 DEVELOPMENT CHARGES BACKGROUND STUDY
DEVELOPMENT-RELATED CAPITAL FORECAST

TRANSPORTATION INFRASTRUCTURE

($000)

			2014		2015		2016		2017		2018		2019		2020		2021		2022		2023		TOTAL		
PROJ. NO.	DEV-RELATED %	ROAD SYSTEM EXPANSION WITH SIDEWALKS	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Total
5170	100%	RR29(Lancaster) Union to Bridgeport																		60				60	60
5183	100%	RR52(Bridge) Kit/Wool Bdry to Bloomingda		350																				350	350
5190	100%	RR20(Bloomingdale) Kraft to Bridge				245																		245	245
5377	100%	RR4 Ottawa St Mill to Homer Watson RR28										180												180	180
5378	100%	RR#5 (Hutchison) Lobsinger to Crosshill						600																600	600
5390	100%	Reg Rd 9 (Erb) Fischer-Hallman to Erbsvi										270												270	270
5391	100%	RR15(King)Hwy 85 Ramp to Northfield				45																		45	45
5392	100%	RR17(Sawmill)Conestogo Bridge to Musselm								10														10	10
5393	100%	RR17(Fountain) King to Cherry Blossom						760																760	760
5404	100%	RR41(Bishop)Conestoga to Concession				740																		740	740
5407	100%	RR50 Northfield, King to Westmount		360																				360	360
5416	100%	(St Andrews) Cambridge BDRY to Grand Ave						1,390																1,390	1,390
5417	100%	RR86(Church) Canagaigue Brdg to Arthur												60										60	60
5420	100%	RR97(Cedar) Osborne to Cambridge Brdy						480																480	480
5428	100%	RR6 (Snyders)0.9kmE of Notre Dame						95																95	95
5430	100%	RR 8 (Weber), Benjamin to King																		150				150	150
5431	100%	RR8 (King St) Printery Rd. To Sawmill Rd						370																370	370
5487	100%	RR#8 (King) Sportsworld to Hwy 401																		710				710	710
5489	100%	RR8(Weber)King to Milford		10																				10	10
5493	100%	RR12(NotreDame)HWY7/8 to Snyders						165																165	165
5495	100%	RR#17 (Sawmill) St. Charles to Snyder'sF						335																335	335
5498	100%	RR#43 (Myers) Branchton to Franklin										435												435	435
5568	100%	RR#16 (Kressler) Lobsinger to Appolo												100										100	100
5576	100%	RR52(Bridge) Woolwich to University												240										240	240
5579	100%	RR69(Manitou)HomerWatson to Bleams						1,040																1,040	1,040
5603	100%	RR17(Sawmill)King St to Waterloo/St Jaco										200												200	200

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REGION OF WATERLOO
2014 DEVELOPMENT CHARGES BACKGROUND STUDY
DEVELOPMENT-RELATED CAPITAL FORECAST

TRANSPORTATION INFRASTRUCTURE

($000)

			2014		2015		2016		2017		2018		2019		2020		2021		2022		2023		TOTAL		
PROJ. NO.	DEV-RELATED %	SIDEWALKS CONSTRUCTED WITH ROAD WORKS	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Total
5636	100%	RR58(Swan)Hilltop to Stanley								110														110	110
5648	100%	RR#8 (King) Fairway to Weber								5														5	5
5675	100%	RR#50 (Westmount) Fischer-Hallman to Blo																		215				215	215
5680	100%	RR#4(Ottawa) Lackner to Old Chicopee								215														215	215
5681	100%	RR#4(Ottawa) Westmount to Fischer-Hallma																410						410	410
5682	100%	RR#5 (Nafziger) Gerber to Lawrence																				450		450	450
5683	100%	RR#5(Queen's Bush) Firella Brdg to Hutchi																				275		275	275
5688	100%	RR#10 (Herrgott) Lobsinger to St. Clemen																		160				160	160
5689	100%	RR#15(Lobsinger) Park to .8 km w Herrgot												60										60	60
5690	100%	RR#21 (Arthur) Whippoorwill to First																				480		480	480
5695	100%	RR#49 (Wrigley) Stanley to Swan																200						200	200
5697	100%	RR#53 (Fairway) Old Chicopee to River																225						225	225
5699	100%	RR#53 (Fairway) Wilson to Manitou												60										60	60
5700	100%	RR#55 (Victoria) Frederick to River														720								720	720
5703	100%	RR#56(Bleams) Manitou to Homer Watson																		425				425	425
5705	100%	RR56 (Bleams) Fischer Hallman to Gehl																420						420	420
5706	100%	RR#57 (University) Bridge to HW 85NB ram														70								70	70
5766	100%	RR1(Snyder's)Foundry to Gingerich										75												75	75
5799	100%	RR23(Katherine St)Lundy Rd to Bridge#2301(Cox Creek)																		160				160	160
5827	100%	RR41(Bishop St)Franklin Blvd(RR36) to 50M E of Conestoga Blvd																				270		270	270
5923	100%	RR39(Pinebush) Townline Rd (RR33) to Franklin Blvd (RR36)																				400		400	400
5927	100%	RR17(Fountain St N)Cherry Blossom to Map										250												250	250
5932	100%	RR8(King St E) Sportsworld Dr (RR38) to Riverbank Dr																		585				585	585
5973	100%	RR52(Bridge) Lexington to Northfield(RR 22)																				290		290	290
5981	100%	RR8(Weber St E) HWY 8 Ramp to Fergus Ave																		80				80	80
5983	100%	RR15(King) Northfield(RR50) to HWY 85 Ramp																				600		600	600
5985	100%	RR27(Beverly) Beverly/Samuelson to Dundas St												355										355	355
5986	100%	RR46(Roseville) to Fischer Hallman(RR58)																		340				340	340
5987	100%	RR51(Foundry) Gingerich Rd to Snyder's Rd																				530		530	530
6510	100%	RR9(Bridgeport) King to Erb										50												50	50
		TOTAL REGIONAL SIDEWALKS CONSTRUCTED WITH ROAD WORKS		720		1,030		5,235		340		1,460		875		790		1,255		2,885		3,295		17,885	17,885

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REGION OF WATERLOO
2014 DEVELOPMENT CHARGES BACKGROUND STUDY
DEVELOPMENT-RELATED CAPITAL FORECAST

TRANSPORTATION INFRASTRUCTURE

($000)

			2014		2015		2016		2017		2018		2019		2020		2021		2022		2023		TOTAL		
PROJ. NO.	DEV-RELATED %	SIDEWALKS CONSTRUCTED AS SEPERATE PROJECTS	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Total
5712	100%	RR4(Ottawa) Wilderness Dr to Walkway at		50																				50	50
5715	100%	RR#8 (Weber) Wilfred to Montgomery		10		10		50		65														135	135
5726	100%	RR#28 (Fountain) Shantz Hill to Preston		40				80		260														380	380
5730	100%	RR#50(Westmount) Union to Forsyth		10				10		120														140	140
5743	100%	RR#64(Charles) Kent to Stirling						60																60	60
5906	100%	RR86 Church St, Herbert St to E of Raisi		45																				45	45
6340	100%	RR17 (Fountain St) Fountain St Bridge				300																		300	300
6346	100%	RR27 (Beverly St) at Railway Crossing										100		1,000										1,100	1,100
		TOTAL REGIONAL SIDEWALKS CONSTRUCTED AS SEPERATE PROJECTS		155		310		200		445		100		1,000										2,210	2,210
		TOTAL TRANSPORTATION INFRASTRUCTURE	13,483	79,369	6,331	66,668	2,089	77,413	1,148	52,183	536	66,234	26	32,624		35,340		13,355		39,964		36,920	23,613	500,069	523,682

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REGION OF WATERLOO
2014 DEVELOPMENT CHARGES BACKGROUND STUDY
DEVELOPMENT-RELATED CAPITAL FORECAST ($000)

	2014		2015		2016		2017		2018		2019		2020		2021		2022		2023		TOTAL 2014 - 2023 ($000)		
SUMMARY - TRANSPORTATION	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Benefit to Existing	Growth Share	Non-Growth Share	Growth Share	Total
PROGRAMS																							
INTERSECTION IMPROVEMENTS (DEVELOPMENT-RELATED)	9,545	18,045	4,704	9,446	300	9,840	750	9,205	150	3,365		4,550		2,090		2,250		5,130		1,975	15,450	65,896	81,345
DEVELOPMENT-RELATED TURN LANES		1,850	25	265	100	890	323	1,213		835		1,925		1,480		1,835		1,650		1,400	448	13,343	13,790
NEW TRAFFIC SIGNAL INSTALLATIONS		2,525		1,200		600		500		500		500		500		500		500		500		7,825	7,825
ROAD WIDENINGS	3,872	42,958	1,602	39,653	1,689	35,286	75	6,825	386	30,179	26	19,759		28,905		2,985		15,964		24,995	7,651	247,508	255,159
NEW ROAD LINKS AND STUDIES	65	11,407		13,610		21,392		29,635		27,820		2,030		700		3,055		12,585		1,970	65	124,203	124,268
NEW CYCLING LANES		1,710		1,155		3,970		4,020		1,975		1,985		875		1,475		1,250		2,785		21,200	21,200
NEW SIDEWALKS		875		1,340		5,435		785		1,560		1,875		790		1,255		2,885		3,295		20,095	20,095
TOTAL TRANSPORTATION INFRASTRUCTURE CAPITAL COST	13,483	79,369	6,331	66,668	2,089	77,413	1,148	52,183	536	66,234	26	32,624		35,340		13,355		39,964		36,920	23,613	500,069	523,682

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REGION OF WATERLOO
CASHFLOW AND DETERMINATION OF DEVELOPMENT CHARGE
TRANSPORTATION
RESIDENTIAL DEVELOPMENT CHARGE

TRANSPORTATION

OPENING CASH BALANCE FROM APPLICABLE RESERVES	$26,192,959			**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**TOTAL**
OPENING CASH BALANCE ($000)				$26,193.0	($4,450.1)	($20,869.1)	($43,710.7)	($49,069.0)	($64,971.7)	($54,784.2)	($45,165.0)	($16,026.9)	($9,840.1)	
2014-2023 RESIDENTIAL FUNDING REQUIREMENTS														
- TRANSPORTATION - current ($000) (1)				$55,406.6	$47,471.2	$56,224.1	$38,657.7	$50,048.4	$25,144.6	$27,782.9	$10,709.2	$32,687.5	$30,801.6	**$374,933.8**
REVENUE - current ($000)	Rate for 2014													
- Dev. Charge Receipts (2)	$3,165.60	Inflation	2.0%	$24,691.5	$31,729.9	$35,110.9	$35,782.5	$37,197.8	$38,668.9	$40,198.0	$41,787.4	$39,634.3	$41,005.3	**$365,806.5**
	Balance:	Positive	Negative											
- Interest on Opening Balance	Rate:	3.5%	5.5%	$916.8	($244.8)	($1,147.8)	($2,404.1)	($2,698.8)	($3,573.4)	($3,013.1)	($2,484.1)	($881.5)	($541.2)	**($16,072.0)**
- Interest on In-year Transactions (excl.int.)	Rate:	3.5%	5.5%	($844.7)	($432.9)	($580.6)	($79.1)	($353.4)	$236.7	$217.3	$543.9	$121.6	$178.6	**($992.7)**
TOTAL REVENUE ($000)				$24,763.6	$31,052.3	$33,382.5	$33,299.3	$34,145.6	$35,332.1	$37,402.1	$39,847.2	$38,874.4	$40,642.7	**$348,741.8**
CLOSING CASH BALANCE ($000)				($4,450.1)	($20,869.1)	($43,710.7)	($49,069.0)	($64,971.7)	($54,784.2)	($45,165.0)	($16,026.9)	($9,840.1)	$1.0	
TRANSPORTATION PER CAPITA CHARGE	**$3,165.60**													
(1) Based on residential funding requirements in constant $000 of				*$55,406.6*	*$46,540.4*	*$54,040.8*	*$36,428.0*	*$46,237.0*	*$22,774.2*	*$24,670.4*	*$9,323.0*	*$27,898.5*	*$25,773.4*	***$349,092.3***
(2) Based on population growth in new units of				*7,800*	*9,827*	*10,661*	*10,652*	*10,856*	*11,064*	*11,276*	*11,492*	*10,686*	*10,839*	***105,151***

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REGION OF WATERLOO
CASHFLOW AND DETERMINATION OF DEVELOPMENT CHARGE
TRANSPORTATION
NON-RESIDENTIAL DEVELOPMENT CHARGE

TRANSPORTATION

OPENING CASH BALANCE FROM APPLICABLE RESERVES	$11,328,050			**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**TOTAL**
OPENING CASH BALANCE ($000)				$11,328.0	($3,021.1)	($13,644.5)	($25,758.3)	($28,456.3)	($35,091.0)	($30,324.3)	($25,562.4)	($12,205.0)	($7,107.4)	
2014-2023 NON-RESIDENTIAL FUNDING REQUIREMENTS														
- TRANSPORTATION - current ($000) (1)				$23,962.5	$20,530.6	$24,316.0	$16,718.8	$21,645.2	$10,874.7	$12,015.7	$4,631.5	$14,136.8	$13,321.2	**$162,153.1**
REVENUE - current ($000)	Rate for 2014													
- Dev. Charge Receipts (2)	$61.48	Inflation:	2.0%	$9,611.5	$10,353.2	$13,256.9	$15,471.8	$16,711.2	$17,456.2	$18,334.9	$19,140.9	$19,806.5	$20,691.2	**$160,834.3**
	Balance:	Positive	Negative											
- Interest on Opening Balance	Rate:	3.5%	5.5%	$396.5	($166.2)	($750.5)	($1,416.7)	($1,565.1)	($1,930.0)	($1,667.8)	($1,405.9)	($671.3)	($390.9)	**($9,567.9)**
- Interest on In-year Transactions (excl.int.)	Rate:	3.5%	5.5%	($394.7)	($279.9)	($304.1)	($34.3)	($135.7)	$115.2	$110.6	$253.9	$99.2	$129.0	**($440.8)**
TOTAL REVENUE ($000)				$9,613.3	$9,907.2	$12,202.3	$14,020.8	$15,010.4	$15,641.4	$16,777.6	$17,988.9	$19,234.4	$20,429.3	**$150,825.6**
CLOSING CASH BALANCE ($000)				($3,021.1)	($13,644.5)	($25,758.3)	($28,456.3)	($35,091.0)	($30,324.3)	($25,562.4)	($12,205.0)	($7,107.4)	$0.6	
TRANSPORTATION CHARGE PER M^2	**$61.48**													
(1) Based on non-residential funding requirements in constant $000 of				*$23,962.5*	*$20,128.0*	*$23,371.8*	*$15,754.5*	*$19,996.8*	*$9,849.5*	*$10,669.6*	*$4,032.0*	*$12,065.7*	*$11,146.6*	***$150,977.0***
(2) Based on non-residential GFA growth in square metres of				*156,335*	*165,097*	*207,257*	*237,141*	*251,116*	*257,167*	*264,815*	*271,036*	*274,962*	*281,611*	***2,366,537***

APPENDIX D

WATER AND WASTEWATER TECHNICAL APPENDIX

APPENDIX D

WATER AND WASTEWATER SERVICES
TECHNICAL APPENDIX

This appendix provides the analysis undertaken to establish the development charge rates for Water and Wastewater services in the Region.

The capital planning, operation and maintenance of Regional Water and Wastewater infrastructure is carried out by the Water Services Division of the Transportation and Environmental Services Department. The primary basis of the development-related capital program for this infrastructure is the Region's recently approved 10-year capital program. Through discussions with Regional staff, it was also considered appropriate, for the purpose of the development charge calculation, to include portions of Water and Wastewater infrastructure that were built in prior years, but which were designed to accommodate development in the forecast period (and beyond).

All of the identified projects are required to service the demands of new development between 2014 and 2023, subject to annual capital budget reviews. It is noted also that most of the projects included in the 2014-2023 development-related capital program will actually accommodate growth to 2031. The analysis accounts for this fact and only includes portions of project costs related to development over the next ten years in the development charge calculation. Consistent with s. 5. (1)7. of the *Development Charges Act* (*DCA*), there is no legislated percentage reduction in the eligible development-related capital cost for the provision of Water and Wastewater infrastructure.

For the purposes of calculating development charges, Water and Wastewater infrastructure in the Region is classified into two categories:

> **W1 and WW1 projects** - are projects that add capacity to the Region's Water (W1) and Wastewater (WW1) systems. In most cases these projects are required primarily to service development and provide little, if any, benefit to the existing community. In the absence of any benefit to the existing community the entire cost of these projects is deemed to be development-related.

W2 and WW2 projects - are projects that, though they do not add capacity to the Region's Water and Wastewater systems, are required to maintain the quality of the systems. These projects generally provide benefits to both the existing community as well as growth. The development-related share of these projects is based on the ratio of future growth to the forecast 2031 customer base. Some W2 and WW2 projects are required to service growth only and provide no benefit to the existing community. These projects are assumed to be 100% development-related.

This appendix is divided into section D.1 for Water and section D.2 for Wastewater. The analysis for each service is displayed in seven sets of tables:

Table 1	Population Forecasts by Service Area
Table 2	Assessment of Additional Capacity Requirements (Wastewater)
Table 3	Allocation of Costs & Benefits to W1 and WW1 Projects
Table 4	Allocation of Costs & Benefits to W2 and WW2 Projects
Table 5	Development-Related Capital Program 2014-2023
Table 6	Summary of Cost/Benefit Allocation
Table 7	Development Charge Calculation

An overview of the content and purpose of each of the tables is given below.

D.1 WATER SERVICES

This section provides the background data and analysis undertaken to arrive at the calculated development charge rates for Water services.

The Region currently owns and operates a large water system (the Integrated Urban System or IUS) which services the cities of Cambridge, Kitchener and Waterloo and the towns of Elmira and St. Jacobs, as well as a number of smaller systems in the Townships of North Dumfries, Wellesley, Wilmot and Woolwich (the "rural system").The IUS consists of one surface water treatment plant, 77 production wells, 4 groundwater treatment plants, 32 water storage reservoirs and 23 pumping stations. The rural systems are generally smaller. These systems consist of a total of 34 production wells, 11 groundwater treatment plants, 16 water storage reservoirs and 14 pumping stations. The Region is also responsible for a number of trunk watermains that form the primary water distribution network.

The primary source documents for the analysis of development-related servicing requirements for the water systems are:

- **Water Supply and Distribution Operations Master Plan** – this master plan focuses on assessing and optimizing the water distribution system. Adoption of the plan's recommendations by Council in April 2013 has resulted in a reduction of the Region's 10 year water capital program by almost $70 million.

- **Water Supply Master Plan Update** – currently underway, the focus of this master plan is to assess the long-term capacity of the Region's water supply, particularly in the context of the recent trend of declining water demand.

- **Tier 3 Water Budget and Water Quantity Risk Assessment** – this study responds to a Provincial requirement to determine whether individual water supply wells can meet current and future water demand without depleting the aquifers.

- **Water and Wastewater Monitoring Report (2013)** – this annual report provides details on current water usage, commitments to future development, and remaining system capacity.

The results of the above master plans and reports have led the Region to move from developing a Great Lake supply system to an approach that extends the life of existing

groundwater-based systems. This shift results in a less costly 10 year development-related capital program for the Water service than was presented in the Region's previous *Development Charges Background Study, 2009*.

TABLE 1 POPULATION FORECASTS

Table 1 provides annual population forecasts for each of the Region's Water service areas to 2031. The forecasts are taken from background data used in the Region's *2013 Water and Wastewater Monitoring Report*. They form the basis of the forecast demand for Water services over the development charge planning period 2014 to 2023 and beyond.

TABLE 2 ALLOCATION OF COSTS AND BENEFITS OF W1 PROJECTS

Although the planning horizon for the purposes of calculating a development charge is 10 years (2014-2023), the Region assesses its capacity requirements for Water services based on a long-term planning horizon to 2031. In the past, the amount of supply and treatment capacity required to meet the needs of development was determined on a system-by-system basis. This approach is no longer appropriate given *Clean Water Act* requirements to consider the impact of increased system demands on broader aquifers.

The *DCA* requires that Regional Council express its intent to provide future capital facilities at the level incorporated in the development charges calculation. Based on the Council approved 10-year capital program, a development-related capital program which sets out those projects that are required to service anticipated development for the ten year period from 2014 to 2023 and beyond has been prepared. The W1 projects in the program, i.e. those projects that are required to provide capacity for new development, are listed in Table 2, page 1. They include:

- water efficiency projects that, by reducing of water demand across the Region, release capacity for new development and are, as such, 100% development-related;

- upgrades, expansions and new facilities that either add additional capacity to meet the servicing needs of new development (such as Project 4904, the ASR System) or are required to sustain existing capacity so that unused system

capacity remains available to service new development (such as Projects 4015 and 4044 in the IUS); and

- new watermains that are required to connect new development to existing systems.

Table 2, page 1, provides capital cost estimates and descriptions of the proposed works for each of the planned W1 projects. For each project, the share of costs attributable to development to 2031 is identified. The justification for categorizing each project as a W1 (capacity enhancing) project is provided in the comments section of the table.

Table 2, page 2, provides similar details for W1 projects that, though they have already been built, have been oversized and will provide capacity for growth occurring between 2014 and 2031. Shares of the capital cost to build each project are calculated for development that has occurred to date (based on RDC monies already spent on the works) and development anticipated to occur from 2014-2031. Any remaining capacity is considered to benefit development beyond 2031 (for example, the Ayr Water Supply System Expansion built in 2006 is estimated to slightly exceed demand requirements to 2031).

TABLE 3 ALLOCATION OF COSTS AND BENEFITS OF W2 PROJECTS

Table 3, page 1, provides capital cost estimates and descriptions of the proposed works for each of the W2 projects in the development-related capital program. These projects, though they do not add capacity to the Region's Water systems, are required to maintain the quality of the systems. They generally provide benefits to both the existing community as well as development. The development-related share of these projects is based on the ratio of growth that is forecast over the 2014-2031 period to the forecast 2031 serviced population (see Table 1).

The projects listed in Table 3, page 2, have already been built but have been oversized to provide a benefit to growth occurring between 2014 and 2031. The development-related share of these projects is based on the ratio of growth that is forecast over the 2014-2031 period to the forecast 2031 serviced population (see Table 1).

TABLE 4 DEVELOPMENT-RELATED CAPITAL PROGRAM

The entire Water system development-related capital program is summarized in Table 4, pages 1-2. The table shows the growth and non-growth shares of capital costs for each project in each year of the ten year planning period 2014 to 2023 and over the entire planning period 2014 to 2031. It is noted that the non-growth costs include benefits to the existing community, post-2031 benefits (if any) and, for previously built facilities, benefits attributable to development that has already occurred (the "prior growth" share). The total cost of the capital program to 2031 which is included in the 2014-2023 program budget is $636 million, of which $256 million (40%) is deemed development-related and $380 million (60%) is considered non-development related (page 2). It is noted that additional projects beyond those included here will be identified in future capital programs to service development to 2031.

TABLE 5 SUMMARY OF COST/BENEFIT ALLOCATION

Table 5 summarizes the allocation of costs and benefits of the development-related capital program over the 10-year development charge planning period and the post-2023 period to 2031. Of the $636 million cost of the entire capital program, $380 million represents a "benefit to existing" cost that must be funded from non-development charge sources.

Of the $256 million development-related capital cost identified in the program, $145 million (57%) is related to development in the 10 year period to 2023 and $111 million (43%) is related to development after 2023. It is anticipated that the "post-2023" costs, including associated financing, will be fully fundable through future development charges. However, interim financing of these costs will be required.

The $145 million development-related share for the 2014-2023 period is carried forward to the development charge calculation.

TABLE 6 CALCULATION OF DEVELOPMENT CHARGE

The first step in the determination of the development charge rate is the allocation of the development charge eligible capital cost of $145 million between the residential and the non-residential sectors. For Water the development-related costs have been allocated 71.3% residential ($103 million) and 28.7% non-residential ($42 million).

This ratio is based on water use in the IUS for the years 2008, 2009, 2010, and 2012 which is shown in the following table (data for 2011 is unavailable).

IUS (Cambridge, Kitchener, Waterloo) Annual Water Demands (m^3)

Year	Annual Water Use (m^3)			% by Type of Use	
	Residential	ICI	Total	Residential	ICI
2008	32,756,742	13,528,996	46,285,738	70.8%	29.2%
2009	31,795,322	12,115,399	43,910,721	72.4%	27.6%
2010	29,607,465	11,940,324	41,547,789	71.3%	28.7%
2011	n/a	n/a	n/a	n/a	n/a
2012	31,628,696	13,080,336	44,709,032	70.7%	29.3%
4 Year Average (2008, 2009, 2010, & 2012)				**71.3%**	**28.7%**

A cashflow analysis is also undertaken to account for the timing of projects and receipt of development charges. Interest earnings or borrowing costs are, therefore, accounted for in the calculation as allowed under the *DCA*. Based on the development forecast in Appendix A, the analysis calculates the development charge rate that is required to finance the net development-related capital spending plan including provisions for any borrowing costs or interest earnings on the reserve funds. The residential rate is expressed as a development charge per capita (Table 6, page 1). The non-residential rate is expressed as a development charge per square metre of gross floor area (Table 6, page 2).

The cashflow analysis is designed so that the closing cash balance at the end of the planning period is as close to nil as possible. Existing Water development charge reserve funds that are available to fund the development-related capital program are accounted for as opening balances in the cashflows. In order to determine appropriate development charge rates reflecting borrowing and earnings necessary to support the net development-related funding requirement, assumptions are used for the inflation rate and interest rate. An inflation rate of 2.0 per cent is used for the funding requirements and interest rates of 5.5 per cent (negative balance) and 3.5 per cent (positive balance) are used for borrowing/earnings on the funds. This yields effective real discount rates of 3.5 per cent and 1.5 per cent respectively.

As shown in Table 6, pages 1-2 the development-related capital program and forecasted growth result in Water development charges of $733.80 per capita for new residential development and of $13.19 per m^2 for new non-residential development.

The following is a summary of the Water development charge rate calculation:

Service	Development-Related Capital Program ($000)		Calculated Development Charge	
	Total 2014-2023	Dev. Charge Recoverable	Residential ($/capita)	Non-Residential ($/m^2)
Water	**$635,712**	**$144,834**	**$733.80**	**$13.19**

APPENDIX D.1
TABLE 1

REGION OF WATERLOO
2014 DEVELOPMENT CHARGES BACKGROUND STUDY
POPULATION BY WATER SERVICE AREA

Water Service Area	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Integrated Urban System[1]	480,806	486,779	493,472	498,074	508,841	517,396	526,111	534,991	543,003	552,274	561,700	571,286
Baden/New Hamburg S.A.	11,056	11,327	11,766	12,073	12,570	12,910	13,262	13,627	14,004	14,396	14,801	15,220
Ayr S.A.	4,099	4,207	4,220	4,266	4,667	4,846	5,037	5,242	5,463	5,699	5,953	6,226
Wellesley S.A.	2,536	2,681	2,829	2,901	3,169	3,231	3,294	3,358	3,424	3,491	3,560	3,631
St. Clements S.A.	1,415	1,442	1,350	1,360	1,259	1,262	1,264	1,266	1,268	1,271	1,273	1,275
Total	499,912	506,436	513,637	518,674	530,506	539,645	548,968	558,484	567,162	577,131	587,287	597,638

Source: Background data to *2013 Water and Wastewater Monitoring Report* provided by Region.

1. Includes Cambridge, Kitchener, Waterloo, Elmira & St. Jacobs.

Water Service Area	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Integrated Urban System[1]	581,033	590,947	600,694	610,558	620,540	630,642	640,864	650,631	660,546	670,613	680,833	691,209
Baden/New Hamburg S.A.	15,655	16,104	16,560	17,026	17,505	17,995	18,497	18,986	19,488	20,004	20,533	21,076
Ayr S.A.	6,518	6,832	7,174	7,535	7,916	8,320	8,747	9,186	9,647	10,131	10,639	11,173
Wellesley S.A.	3,703	3,776	3,846	3,922	3,997	4,072	4,149	4,222	4,297	4,373	4,450	4,529
St. Clements S.A.	1,277	1,280	1,282	1,284	1,286	1,288	1,290	1,292	1,294	1,296	1,298	1,300
Total	608,186	618,939	629,556	640,325	651,244	662,317	673,547	684,317	695,273	706,417	717,754	729,287

Source: Background data to *2013 Water and Wastewater Monitoring Report* provided by Region.

1. Includes Cambridge, Kitchener, Waterloo, Elmira & St. Jacobs.

Water Service Area	Growth 2014-2031		Share of Growth by Period			
			2014-2023		2024-2031	
	#	%	#	%	#	%
Integrated Urban System[1]	173,813	25.1%	93,162	53.6%	80,651	46.4%
Baden/New Hamburg S.A.	8,166	38.7%	4,116	50.4%	4,050	49.6%
Ayr S.A.	6,327	56.6%	2,689	42.5%	3,638	57.5%
Wellesley S.A.	1,298	28.7%	691	53.2%	607	46.8%
St. Clements S.A.	38	2.9%	22	57.9%	16	42.1%
Total	189,642	26.0%	100,680	53.1%	88,962	46.9%

1. Includes Cambridge, Kitchener, Waterloo, Elmira & St. Jacobs

Notes to Table:

(1) From Region of Waterloo based on background data for the 2013 Water and Wastewater Monitoring Report (WWWMR). Forecasts are based on assumptions regarding the extent and delineation of future service areas.

(2) Regional population estimates are based on Census of Canada data, but additionally include students.

(3) The population estimates in this document are intended only in the context of water and wastewater servicing requirements in the Region as they only reflect occupant data within the mapped bounds of each water and wastewater service area. It is important to note that service area boundaries do not necessarily match municipal settlement area boundaries.

APPENDIX D.1
TABLE 2 - PAGE 1

REGION OF WATERLOO
2014 DEVELOPMENT CHARGES BACKGROUND STUDY
W1 DEVELOPMENT-RELATED WATER PROJECTS IN THE CAPITAL FORECAST

Project Name	Project Number	Net Development Related Capital Cost (2013 $)	Growth Share 2014-2031	Comments
Water Efficiency				
All Water Efficiency Projects	Various - See 2014-2022 Water Budget	$6,740,000	100.0%	Projects part of the Water Efficiency Program reduce water demands that delay the need for future new water sources and provide additional capacity to supply new growth.
Studies/Masterplans				
Long Term Water Supply Strategy-5yr. Rev	4007	$850,000	100.0%	The study assesses the strategy for long term water supply in the Region to provide water supply for new growth
Upgrades, Expansions & New Facilities				
Integrated Urban System Groundwater Supply Study	4014	$625,000	100.0%	Facilitates part of the Long Term Supply Strategy to allow population growth in the IUS
Waterloo North Water Supply System	4015	$9,900,000	100.0%	New system to provide long term water supply and redundancy to IUS
Production Treatment Facilities System Expansion	4044	$12,000,000	100.0%	New treatment facilities for treating new sources for providing security for long term growth in the Region
Pumping & Storage Facilities System Expa	4051	$12,000,000	100.0%	New pumping and storage facilities for providing security for long term growth in the Region.
Maple Grove Area Water Supply System	4134	$5,750,000	100.0%	New system to provide long term water supply and redundancy to IUS
New Hamburg Reservoir Expansion	4175	$4,800,000	40.2%	Expansion of existing reservoir to provide additional storage for growth in Baden and New Hamburg
LTWS ASR Stages 1 + 2	4904	$5,150,000	100.0%	System expansion to provide long term peaking capacity to the IUS
Kitchener/Waterloo Zone 6 Reservoir	4940	$529,000	100.0%	Facilities to allow population growth in the IUS
New Watermains				
Erbsville Rd/Columbia St	4074	$1,700,000	100.0%	New watermains required to service growth in the IUS
Baden New Hamburg Loops	4086	$3,550,000	100.0%	New watermains required to service growth in Baden and New Hamburg
Region Watermains	4083	$15,050,000	100.0%	New Watermains required to service growth in the Region
Tri City Distribution Upgrades	Various - See 2014-2023 Water Budget	$39,728,000	100.0%	New Watermains required to service growth in the IUS

APPENDIX D.1
TABLE 2 - PAGE 2

REGION OF WATERLOO
2014 DEVELOPMENT CHARGES BACKGROUND STUDY
W1 GROWTH-RELATED WATER PROJECTS ALREADY BUILT AND OVERSIZED TO ACCOMMODATE FUTURE GROWTH

Project Name	Project Number	Service Area	Net Growth Related Capital Cost (1)	Growth Share from Project Completion - 2013 (2)	Growth Share 2014-2031 (3)	Growth Share Post 2031 (4)	Comments
LTWS ASR Stage 1	4904	IUS	$6,310,000	9.3%	70.6%	20.1%	System was completed in 2005 to provide peaking capacity of 22.7 MLD to service future growth in the IUS
Ayr Water Supply System Expansion	4933	Ayr	$6,737,000	15.1%	82.8%	2.0%	Treatment plant and reservoir were completed in 2006 to provide additional capacity of 3.2MLD to service future growth in AYR.
Zone 7 PS	4896	IUS	$966,000	100.0%	0.0%	0.0%	Pumping station was completed in 2005 to provide capacity to service future growth in the West Side of the IUS. No growth yet so 100% future growth.
Mannheim WTP Residual Capacity	N/A	IUS	$66,500,000	59.2%	40.8%	0.0%	WTP was completed in 1992 to provide capacity to service future growth - WTP capacity of 72.6 MLD.
Cambridge East Water Supply System	N/A	IUS	$14,139,685	59.2%	40.8%	0.0%	WTPs were completed in 1996 to provide capacity to service future growth with combined capacity of 33.7 MLD.
Middleton Reservoir and Pumping Station	N/A	IUS	$7,349,071	59.2%	40.8%	0.0%	Pumping station and reservoir were completed in 1996 to provide capacity to service future growth - system capacity of 40.3 MLD.
Zone 6 PS	4940	IUS	$8,200,000	87.8%	12.2%	0.0%	Pumping station was completed in 2008 (commissioned May 2009) to provide capacity to service future growth in Western Kitchener and Waterloo
Water Efficiency Projects	N/A	Region	$3,450,000	58.0%	42.0%	0.0%	Projects part of the Water Efficiency Program reduce water demands that delay the need for future new water sources and provide additional capacity to supply new growth. Expenditures between 2009 and 2013.

Notes:

(1) Actual construction costs shown.

(2) Share of project attributed to growth that occurred between project completion and 2013.

(3) Share of project required for growth between 2014 and 2031.

(4) Residual capacity of project attributed to post-2031 growth.

APPENDIX D.1
TABLE 3 - PAGE 1

REGION OF WATERLOO
2014 DEVELOPMENT CHARGES BACKGROUND STUDY
W2 WATER PROJECTS IN THE CAPITAL FORECAST BENEFITING BOTH GROWTH AND EXISTING COMMUNITY

Project Name	Project Number	Service Area	2013 Population	2031 Population	Population Growth from 2014 to 2031	Growth Share[1]	Cost (2013$)	Comments
Water Resources Protection								
All Water Resources Protection Projects	Various - See 2014-2023 Water Budget	Region	539,645	729,287	189,642	26.0%	$45,219,000	Water Resources Protection projects help to assure adequate quality and quantity of water benefiting existing and future residents
Studies/Masterplans								
Water Distribution Master Plan	4157	Region	539,645	729,287	189,642	26.0%	$799,000	Long term optimization of water distribution in the IUS for current population and future growth.
Infrastructure Repacements and Upgrades								
IUS Infrastructure Upgrades	Various - See 2014-2023 Water Budget	IUS	517,396	691,209	173,813	25.1%	$12,875,000	Benefit accrues to existing and future residents
Region Infrastructure Upgrades	Various - See 2014-2023 Water Budget	Region	539,645	729,287	189,642	26.0%	$149,909,000	Benefit accrues to existing and future residents
Upgrades, Expansions & New Facilities								
Greenbrook System Upgrades	4017	IUS	517,396	691,209	173,813	25.1%	$200,000	Benefit accrues to existing and future residents - Includes $1,000,000 carry-over and $1,500,000 additional.
Middleton System Upgrades	4018	IUS	517,396	691,209	173,813	25.1%	$330,000	Benefit accrues to existing and future residents
Wilmot Centre Wellfield Standby Well	4021	B/NH	12,910	21,076	8,166	38.7%	$1,300,000	Benefit accrues to existing and future residents
Mannheim WTP RMP Supernatant	4024	IUS	517,396	691,209	173,813	25.1%	$11,135,000	Benefit accrues to existing and future residents
Wells W6/W8 Class EA	4106	IUS	517,396	691,209	173,813	25.1%	$7,800,000	Benefit accrues to existing and future residents
Consolidation of Well Supply	4137	IUS	517,396	691,209	173,813	25.1%	$500,000	Benefit accrues to existing and future residents
Pumping & Storage Upgrades	4144	Region	539,645	729,287	189,642	26.0%	$12,000,000	Benefit accrues to existing and future residents
Mannheim Chemical Storage Building	4151	IUS	517,396	691,209	173,813	25.1%	$317,000	Benefit accrues to existing and future residents
William St & K41/K42 Class EA	4160	IUS	517,396	691,209	173,813	25.1%	$13,550,000	Benefit accrues to existing and future residents
Hespeler Water Supply Class EA	4163	IUS	517,396	691,209	173,813	25.1%	$4,700,000	Benefit accrues to existing and future residents
Conestoga Plains System Upgrades	4173	IUS	517,396	691,209	173,813	25.1%	$3,187,000	Benefit accrues to existing and future residents
Turnbull System Upgrades & Expansion	4174	IUS	517,396	691,209	173,813	25.1%	$3,600,000	Benefit accrues to existing and future residents
Rahman System Upgrades & Expansion	4176	IUS	517,396	691,209	173,813	25.1%	$7,400,000	Benefit accrues to existing and future residents
Cambridge West Water Supply System	4177	IUS	517,396	691,209	173,813	25.1%	$36,500,000	Benefit accrues to existing and future residents
Cambridge Water Distribution Upgrades	4181	IUS	517,396	691,209	173,813	25.1%	$550,000	Benefit accrues to existing and future residents
Cambridge East Source Upgrade	4870	IUS	517,396	691,209	173,813	25.1%	$9,300,000	Benefit accrues to existing and future residents
Strange St. Upgrades	4920	IUS	517,396	691,209	173,813	25.1%	$750,000	Benefit accrues to existing and future residents
Watermains								
Glasgow & Belmont (Wells K11/K13 Gage)	4070	IUS	517,396	691,209	173,813	25.1%	$925,000	Benefit accrues to existing and future residents - Increase in pipe carrying capacity
Watermain Upgrades	4082	Region	539,645	729,287	189,642	26.0%	$17,088,000	Benefit accrues to existing and future residents - Increase in pipe carrying capacity
Weber St - LRT Replacement Cost Share	4179	IUS	517,396	691,209	173,813	25.1%	$4,400,000	Benefit accrues to existing and future residents - Increase in pipe carrying capacity

Notes:

1. Growth share is 2014-2031 population growth as proportion of 2031 population.

APPENDIX D.1
TABLE 3 - PAGE 2

REGION OF WATERLOO
2014 DEVELOPMENT CHARGES BACKGROUND STUDY
W2 WATER PROJECTS ALREADY BUILT AND BENEFITING BOTH GROWTH AND EXISTING COMMUNITY

Project Name	Project Number	Service Area	2013 Population	2031 Population	Population Growth from 2014 to 2031	Growth Share [1]	Cost Adjusted for Prior Growth [2]	Comments
Greenbrook System Upgrades (already completed)	4017	IUS	517,396	691,209	173,813	25.1%	$9,343,809	WTP Project completed in 2008 . Benefit accrues to existing and future residents
Shades Mill WTP - Disinfection Upgrade	4133	IUS	517,396	691,209	173,813	25.1%	$0	Project completed in 2007. Benefit accrues to existing and future residents
Storage & Maintenance Building	4968	Region	539,645	729,287	189,642	26.0%	$2,789,745	Project completed in 2008. Benefit accrues to existing and future residents
New Hamburg WTP	4828	B/NH	12,910	21,076	8,166	38.7%	$937,252	The WTP was completed in 2000 and was constructed to provide capacity of 3.54 MLD to service future growth.
Baden Tank Upgrade - BNHWMP	4908	B/NH	12,910	21,076	8,166	38.7%	$2,144,689	The 3.6 ML tank was completed in 2007 and was constructed to improve storage for the existing population and to provide capacity to service future growth.

Notes:

1. Growth share is 2014-2031 population growth as proportion of 2031 population.

2. Growth-related costs adjusted to account for RDC funds already spent on project.

APPENDIX D.1
TABLE 4 - PAGE 1

REGION OF WATERLOO
2014 DEVELOPMENT CHARGES BACKGROUND STUDY
DEVELOPMENT-RELATED CAPITAL PROGRAM

WATER

($000)

Proj. #	DESCRIPTION	TYPE	Service Area	Growth Share 2014-31	*Carry-Forward*	*Base 2014*	2014 Growth	2014 Non-Growth	2015 Growth	2015 Non-Growth	2016 Growth	2016 Non-Growth	2017 Growth	2017 Non-Growth	2018 Growth	2018 Non-Growth	2019 Growth	2019 Non-Growth	2020 Growth	2020 Non-Growth	2021 Growth	2021 Non-Growth	2022 Growth	2022 Non-Growth	2023 Growth	2023 Non-Growth	**TOTAL** Growth 2014-2023	**TOTAL** Non-Growth	**TOTAL** TOTAL
	PLANNING & STUDIES																												
Water Resources Protection:																													
4001	Regional Models Recalibration	W2	Region	26.0%	*23*		6	17							130	370											136	387	523
4005	MOE Source Water Assessment	W2	Region	26.0%	*250*		65	185	65	185							52	148	52	148							234	666	900
4006	Source Water Implementation	W2	Region	26.0%																									
4099	Greenbrock Long Term Assessment	W2	Region	26.0%	*50*	*10*	16	44																			16	44	60
4124	Source Protection Planning	W2	Region	26.0%	*162*	*310*	123	349	107	303	78	222	98	277	98	277	137	388	85	240	1,320	3,755	1,320	3,755	1,320	3,755	4,682	13,325	18,007
4125	Source Protection Technical Assessment	W2	Region	26.0%	*663*	*1,097*	458	1,302	377	1,073	345	980	347	988	347	988	351	999	286	814	286	814	286	814	286	814	3,369	9,586	12,955
4126	Source Protection Monitoring	W2	Region	26.0%																									
4149	GW/SW Assessments	W2	Region	26.0%	*244*		63	181	52	148	52	148	52	148													219	625	844
4152	MOE Tier 3 Water Stress Assessment	W2	Region	26.0%	*100*	*200*	78	222																			78	222	300
4165	Clean Water Act Implementation	W2	Region	26.0%	*240*	*225*	121	344	72	203	104	296	111	314	104	296	104	296	104	296	104	296	104	296	104	296	1,031	2,934	3,965
4169	Clean Water Act Incentives	W2	Region	0.0%	*115*	*60*		175		315		575		575		600		600		600		600		600		600		5,240	5,240
4170	Monitoring System Management	W2	Region	26.0%	*55*	*325*	99	281	134	381	82	233	82	233	39	111	39	111	39	111	39	111	39	111	39	111	631	1,794	2,425
Water Efficiency:																													
4090	W&E Research & Development Project	W1	Region	100.0%		*75*	75		75		75		75		75		75		75		75		75		75		750		750
4129	Toilet Replacement Program	W1	Region	100.0%		*150*	150		260		260		260		260		260		260		260		260		260		2,490		2,490
4166	Water Efficiency Master Plan	W1	Region	100.0%	*100*		100																				100		100
4864	Water Efficiency - ICI Programs	W1	Region	100.0%		*160*	160		160		160		160		160		160		160		160		160		160		1,600		1,600
4943	Water Efficiency-Outdoor Water Use	W1	Region	100.0%		*180*	180		180		180		180		180		180		180		180		180		180		1,800		1,800
Studies/Masterplans:																													
4007	Long Term Water Supply Strategy-5yr. Rev	W1	Region	100.0%	*50*	*200*	250										300		300								850		850
4157	Water Distribution Master Plan	W2	Region	26.0%	*49*	*150*	52	147									78	222	78	222							208	591	799
4180	Rahman System Upgrades & Expansion	W2	Region	0.0%																									
	TOTAL PLANNING & STUDIES				*2,101*	*3,142*	**1,995**	**3,248**	**1,481**	**2,609**	**1,335**	**2,455**	**1,364**	**2,536**	**1,393**	**2,642**	**1,736**	**2,764**	**1,619**	**2,431**	**2,424**	**5,576**	**2,424**	**5,576**	**2,424**	**5,576**	**18,194**	**35,414**	**53,608**
	INFRASTRUCTURE UPGRADES																												
4027	Mannheim WTP Filter & PreTreatment Upgra	W2	IUS	25.1%	*462*	*1,080*	388	1,154													251	749	629	1,871	251	749	1,519	4,523	6,042
4039	MCC Upgrades	W2	Region	26.0%	*250*		65	185	65	185																	130	370	500
4097	Water Supply Upgrades	W2	Region	26.0%	*150*		39	111																			39	111	150
4112	Building Upgrades	W2	Region	26.0%	*353*	*830*	308	875	194	551	220	625	224	636	47	133	65	185	140	400	229	651	150	425	126	359	1,701	4,842	6,543
4135	Well Optimization & Upgrades	W2	Region	26.0%	*1,000*		260	740	260	740	260	740	260	740	260	740	260	740	260	740	260	740	260	740	260	740	2,600	7,400	10,000
4146	Mannheim RMP Equipment Upgrades	W2	IUS	25.1%																									
4159	Asset Management	W2	Region	26.0%	*800*	*283*	282	801	260	740	312	888	130	370	130	370	182	518	182	518	182	518	182	518	182	518	2,024	5,759	7,783
4164	Wells W7/W8 Electrical Upgrades	W2	IUS	25.1%	*231*		58	173	40	120																	98	293	391
4167	Turnbull PS Upgrades	W2	IUS	25.1%	*270*	*480*	189	561	63	187																	251	749	1,000
4168	Cambridge East WTPs Upgrades	W2	IUS	25.1%	*1,042*	*250*	325	967	143	427																	468	1,394	1,862
4171	Mannheim Plate Settlers Upgrades	W2	IUS	25.1%		*150*	38	112	163	487	163	487															365	1,085	1,450
4172	Distribution Decision Support System	W2	IUS	26.0%									130	370	130	370	260	740									520	1,480	2,000
4786	Capital Asset Storage Division Modificat	W2	Region	26.0%	*24*		6	18																			6	18	24
4863	CMMS	W2	Region	26.0%	*56*	*200*	67	189																			67	189	256
4893	Facilities Upgrades	W2	Region	26.0%	*250*	*2,500*	715	2,035	1,040	2,960	2,080	5,920	3,380	9,620	3,641	10,359	3,901	11,099	3,901	11,099	3,901	11,099	3,901	11,099	3,901	11,099	30,359	86,391	116,750
4903	PS & Reservoir Decomissioning	W2	Region	26.0%	*49*	*200*	65	184																			65	184	249
4911	Regulatory Requirements Upgrades	W2	Region	26.0%	*94*	*210*	79	225	52	148	26	74	26	74	26	74	26	74	26	74	26	74	26	74	26	74	339	965	1,304
4947	Mannheim Chlorination Rehab	W2	IUS	25.1%																									
4969	SCADA Communication Upgrade	W2	Region	26.0%		*1,000*	260	740	221	629	260	740	260	740	260	740									390	1,110	1,651	4,699	6,350
4982	Rahman Reservoir & Pump Station Upgrades	W2	IUS	25.1%	*130*		33	97																			33	97	130
	TOTAL INFRASTRUCTURE UPGRADES				*5,161*	*7,183*	**3,175**	**9,169**	**2,502**	**7,173**	**3,322**	**9,473**	**4,410**	**12,550**	**4,493**	**12,787**	**4,694**	**13,356**	**4,509**	**12,831**	**4,849**	**13,831**	**5,147**	**14,728**	**5,136**	**14,649**	**42,237**	**120,547**	**162,784**

Note: Non-growth costs include benefit to existing community.

APPENDIX D.1
TABLE 4 - PAGE 2

REGION OF WATERLOO
2013 DEVELOPMENT CHARGES BACKGROUND STUDY
DEVELOPMENT-RELATED CAPITAL FORECAST

WATER

($000)

Proj. #	DESCRIPTION	TYPE	Service Area	Growth Share 2014-31	*Carry-Forward*	*Base 2014*	2014 Growth	2014 Non-Growth	2015 Growth	2015 Non-Growth	2016 Growth	2016 Non-Growth	2017 Growth	2017 Non-Growth	2018 Growth	2018 Non-Growth	2019 Growth	2019 Non-Growth	2020 Growth	2020 Non-Growth	2021 Growth	2021 Non-Growth	2022 Growth	2022 Non-Growth	2023 Growth	2023 Non-Growth	TOTAL Growth 2014-2023	TOTAL Non-Growth	TOTAL TOTAL
	UPGRADES, EXPANSIONS & NEW FACILITIES																												
4014	Integrated Urban System Groundwater Supply Study	W1	IUS	100.0%	*450*		450		175																		625		625
4015	Waterloo North Water Supply System	W1	IUS	100.0%	*100*		100		200		200		400		1,000		2,500		2,500		3,000						9,900		9,900
4017	Greenbrook System Upgrades	W2	IUS	25.1%	*200*		50	150																			50	150	200
4018	Middleton System Upgrades	W2	IUS	25.1%	*330*		83	247																			83	247	330
4021	Wilmot Centre Wellfield Standby Well	W2	B/NH	38.7%		*350*	136	214	136	214	232	368															504	796	1,300
4024	Mannheim WTP RMP Supernatant	W2	IUS	25.1%	*435*	*5,000*	1,367	4,068	754	2,246							50	150	377	1,123	251	749					2,800	8,335	11,135
4044	Production Treatment Facilities System Expansion	W1	Region	100.0%											2,000		2,000		2,000		2,000		2,000		2,000		12,000		12,000
4051	Pumping & Storage Facilities System Expa	W1	Region	100.0%											2,000		2,000		2,000		2,000		2,000		2,000		12,000		12,000
4106	Wells W6/W8 Class EA	W2	IUS	25.1%	*100*		25	75									50	150	75	225	503	1,497	805	2,395	503	1,497	1,961	5,839	7,800
4134	Maple Grove Area Water Supply System	W1	IUS	100.0%	*50*		50										200		500		1,000		2,000		2,000		5,750		5,750
4137	Consolidation of Well Supply	W2	IUS	25.1%	*100*		25	75	25	75	25	75	25	75	25	75											126	374	500
4144	Pumping & Storage Upgrades	W2	Region	26.0%											520	1,480	520	1,480	520	1,480	520	1,480	520	1,480	520	1,480	3,120	8,880	12,000
4151	Mannheim Chemical Storage Building	W2	IUS	25.1%	*317*		80	237																			80	237	317
4160	William St & K41/K42 Class EA	W2	IUS	25.1%	*300*	*50*	88	262	126	374	138	412	440	1,310	817	2,433	1,220	3,630	578	1,722							3,407	10,143	13,550
4163	Hespeler Water Supply Class EA	W2	IUS	25.1%									25	75	50	150	50	150			50	150	251	749	754	2,246	1,182	3,518	4,700
4173	Conestoga Plains System Upgrades	W2	IUS	25.1%	*67*	*70*	34	103	38	112	151	449	289	861	289	861											801	2,386	3,187
4174	Turnbull System Upgrades & Expansion	W2	IUS	25.1%									75	225	151	449	402	1,198	277	823							905	2,695	3,600
4175	New Hamburg Reservoir Expansion	W1	B/NH	40.2%											40	60	40	60	241	359	402	598	603	897	603	897	1,930	2,870	4,800
4176	Rahman System Upgrades & Expansion	W2	IUS	25.1%					25	75	101	299	553	1,647	604	1,796	578	1,722									1,861	5,539	7,400
4177	Cambridge West Water Supply System	W2	IUS	25.1%							50	150	126	374	1,006	2,994	2,263	6,737	2,213	6,587	2,263	6,737	1,257	3,743			9,178	27,322	36,500
4181	Cambridge Water Distribution Upgrades	W2	IUS	25.1%		*200*	50	150	63	187	25	75															138	412	550
4870	Cambridge East Source Upgrade	W2	IUS	25.1%					25	75	126	374	277	823	201	599	302	898	377	1,123	528	1,572	377	1,123	126	374	2,339	6,961	9,300
4904	LTWS ASR Stages 1 + 2	W1	IUS	100.0%	*50*		50		100		100										500		2,200		2,200		5,150		5,150
4920	Strange St. Upgrades	W2	IUS	25.1%		*50*	13	37	50	150	126	374															189	561	750
4940	Kitchener/Waterloo Zone 6 Reservoir	W1	IUS	100.0%	*529*		529																				529		529
	TOTAL UPGRADES, EXPANSIONS & NEW FACILITIES				*3,028*	*5,720*	**3,130**	**5,618**	**1,717**	**3,508**	**1,274**	**2,576**	**2,211**	**5,389**	**8,704**	**10,896**	**12,176**	**16,174**	**11,659**	**13,441**	**13,018**	**12,782**	**12,014**	**10,386**	**10,706**	**6,494**	**76,608**	**87,265**	**163,873**
	NEW WATERMAINS																												
4070	Glasgow & Belmont (Wells K11/K13 Gage)	W2	Kit	25.1%	*425*	*500*	233	692																			233	692	925
4074	Erbsville Rd/Columbia St	W1	Wat	100.0%		*100*	100		100												400		500		600		1,700		1,700
4082	Watermain Upgrades	W2	Region	26.0%	*157*	*831*	257	731	286	814	260	740	520	1,480	520	1,480	520	1,480	520	1,480	520	1,480	520	1,480	520	1,480	4,444	12,644	17,088
4083	New Watermains	W1	Region	100.0%	*50*	*400*	450		600		1,000		1,000		2,000		2,000		2,000		2,000		2,000		2,000		15,050		15,050
4086	Baden New Hamburg Loops	W1	B/NH	100.0%	*150*		150		600		1,600		1,000		200												3,550		3,550
4155	Tri City Distribution Upgrades	W1	IUS	100.0%		*500*	500		1,000		1,000		1,000		2,000		2,000		2,000		3,000		3,000		2,000		17,500		17,500
4156	Kitchener Zone(s) 2/4 Distribution Upgra	W1	IUS	100.0%	*-166*	*1,808*	1,642		2,050		650		100		100		400		400								5,342		5,342
4161	Kitchener Zone 4 Feeder Upgrades	W1	IUS	100.0%	*38*	*15*	53		350		4,400		5,500		4,400												14,703		14,703
4178	Weber St - Connection Kitchener to Water	W1	IUS	100.0%	*1,183*		1,183		100						400		400		100								2,183		2,183
4179	Weber St - LRT Replacement Cost Share	W2	IUS	25.1%					553	1,647	553	1,647															1,106	3,294	4,400
	TOTAL WATERMAINS				*1,837*	*4,154*	**4,568**	**1,423**	**5,639**	**2,461**	**9,463**	**2,387**	**9,120**	**1,480**	**9,620**	**1,480**	**5,320**	**1,480**	**5,020**	**1,480**	**5,920**	**1,480**	**6,020**	**1,480**	**5,120**	**1,480**	**65,811**	**16,630**	**82,441**
	OTHER RECOVERABLE PROJECTS (PRIOR OVERSIZED PROJECTS)																												
4904	LTWS ASR Stage 1	W1	IUS	70.6%		*631*	446	185	446	185	446	185	446	185	446	185	446	185	446	185	446	185	446	185	446	185	4,457	1,853	6,310
4908	Baden Tank Upgrade - BNHWMP	W2	B/NH	38.7%		*214*	83	131	83	131	83	131	83	131	83	131	83	131	83	131	83	131	83	131	83	131	831	1,314	2,145
4828	New Hamburg WTP	W2	B/NH	38.7%		*94*	36	57	36	57	36	57	36	57	36	57	36	57	36	57	36	57	36	57	36	57	363	574	937
4933	Ayr Water Supply System Expansion	W1	Ayr	82.8%		*674*	558	116	558	116	558	116	558	116	558	116	558	116	558	116	558	116	558	116	558	116	5,580	1,157	6,737
N/A	Mannheim WTP Residual Capacity	W1	IUS	40.8%		*6,650*	2,713	3,937	2,713	3,937	2,713	3,937	2,713	3,937	2,713	3,937	2,713	3,937	2,713	3,937	2,713	3,937	2,713	3,937	2,713	3,937	27,135	39,365	66,500
N/A	Cambridge East Water Supply System	W1	IUS	40.8%		*1,414*	577	837	577	837	577	837	577	837	577	837	577	837	577	837	577	837	577	837	577	837	5,770	8,370	14,140
N/A	Middleton Reservoir and Pumping Station	W1	IUS	40.8%		*735*	300	435	300	435	300	435	300	435	300	435	300	435	300	435	300	435	300	435	300	435	2,999	4,350	7,349
4940	Zone 6 PS	W1	IUS	12.2%		*820*	100	720	100	720	100	720	100	720	100	720	100	720	100	720	100	720	100	720	100	720	1,002	7,198	8,200
N/A	Water Efficiency Projects	W1	Region	42.0%		*345*	145	200	145	200	145	200	145	200	145	200	145	200	145	200	145	200	145	200	145	200	1,448	2,002	3,450
4017	Greenbrook System Upgrades (already completed)	W2	IUS	25.1%		*934*	235	699	235	699	235	699	235	699	235	699	235	699	235	699	235	699	235	699	235	699	2,350	6,994	9,344
4133	Shades Mill WTP - Disinfection Upgrade	W2	IUS	25.1%																									
4968	Storage & Maintenance Building	W2	Region	26.0%		*279*	73	206	73	206	73	206	73	206	73	206	73	206	73	206	73	206	73	206	73	206	725	2,064	2,790
	TOTAL OTHER RECOVERABLE PROJECTS					*17,301*	*5,266*	**12,035**	**5,266**	**12,035**	**5,266**	**12,035**	**5,266**	**12,035**	**5,266**	**12,035**	**5,266**	**12,035**	**5,266**	**12,035**	**5,266**	**12,035**	**5,266**	**12,035**	**5,266**	**12,035**	**52,659**	**120,347**	**173,006**
	TOTAL PROPOSED EXPENDITURES				**12,127**	**37,500**	**18,133**	**31,494**	**16,605**	**27,785**	**20,661**	**28,925**	**22,371**	**33,990**	**29,476**	**39,840**	**29,192**	**45,809**	**28,073**	**42,218**	**31,477**	**45,704**	**30,870**	**44,205**	**28,652**	**40,233**	**255,509**	**380,204**	**635,712**

Note: Non-growth costs include benefit to existing community.

APPENDIX D.1
TABLE 5

REGION OF WATERLOO
2014 DEVELOPMENT CHARGES BACKGROUND STUDY
SUMMARY OF WATER DEVELOPMENT-RELATED PROGRAM COST ALLOCATION

PROGRAM	Total Cost	Non-Growth Cost[1]	Development-Related Cost		
			Total	RDC Eligible 2014-2023	Post-2023
	($000)				
100-PLANNING & STUDIES	$ 53,608	$ 35,414	$ 18,194	$ 18,194	$ -
200-INFRASTRUCTURE UPGRADES	$ 162,784	$ 120,547	$ 42,237	$ 22,437	$ 19,800
300-UPGRADES, EXPANSIONS & NEW FACILITIES[2]	$ 163,873	$ 87,265	$ 76,608	$ 40,907	$ 35,702
400-WATERMAINS	$ 82,441	$ 16,630	$ 65,811	$ 35,061	$ 30,750
500 - OTHER RECOVERABLE PROJECTS (PRIOR OVERSIZED PROJECTS)	$ 173,006	$ 120,347	$ 52,659	$ 28,236	$ 24,423
TOTAL WATER DEVELOPMENT-RELATED CAPITAL	**$ 635,712**	**$ 380,204**	**$ 255,509**	**$ 144,834**	**$ 110,674**

Notes: (1) Non-growth cost includes benefit to existing community, post-2031 benefits (if any) and, for previously built facilities, will include prior growth shares of project costs.

(2) The 2014-2023 allocation for IUS projects based on share of planned system expansion required for 2023 development. All other allocations are based on shares of each period's growth to total growth over the 2014-2031 forecast period.

APPENDIX D.1
TABLE 6 - PAGE 1

REGION OF WATERLOO
CASHFLOW AND DETERMINATION OF DEVELOPMENT CHARGE
WATER
RESIDENTIAL DEVELOPMENT CHARGE

D.1 WATER

OPENING CASH BALANCE FROM APPLICABLE RESERVES	$23,762,902			**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**TOTAL**
OPENING CASH BALANCE ($000)				$23,762.9	$22,694.1	$23,905.8	$24,253.8	$23,859.1	$20,557.6	$17,221.0	$14,410.8	$9,776.0	$4,448.4	
2014-2023 RESIDENTIAL FUNDING REQUIREMENTS														
D.1 WATER - current ($000) (1)				$7,573.3	$6,944.9	$8,614.5	$9,504.7	$12,648.5	$12,911.1	$12,639.7	$14,688.2	$14,705.4	$13,984.9	**$114,215.2**
REVENUE - current ($000)	Rate for 2014													
- Dev. Charge Receipts (2)	$733.80	Inflation:	2.0%	$5,723.6	$7,355.1	$8,138.9	$8,294.5	$8,622.6	$8,963.6	$9,318.1	$9,686.5	$9,187.4	$9,505.2	**$84,795.5**
	Balance:	Positive	Negative											
- Interest on Opening Balance	Rate:	3.5%	5.5%	$831.7	$794.3	$836.7	$848.9	$835.1	$719.5	$602.7	$504.4	$342.2	$155.7	**$6,471.1**
- Interest on In-year Transactions (excl.int.)	Rate:	3.5%	5.5%	($50.9)	$7.2	($13.1)	($33.3)	($110.7)	($108.6)	($91.3)	($137.5)	($151.7)	($123.2)	**($813.1)**
TOTAL REVENUE ($000)				$6,504.4	$8,156.6	$8,962.5	$9,110.1	$9,347.0	$9,574.6	$9,829.5	$10,053.3	$9,377.8	$9,537.7	**$90,453.5**
CLOSING CASH BALANCE ($000)				$22,694.1	$23,905.8	$24,253.8	$23,859.1	$20,557.6	$17,221.0	$14,410.8	$9,776.0	$4,448.4	$1.2	
WATER PER CAPITA CHARGE	**$733.80**													
(1) Based on residential funding requirements in constant $000 of				*$7,573.3*	*$6,808.7*	*$8,280.0*	*$8,956.5*	*$11,685.3*	*$11,694.0*	*$11,223.7*	*$12,786.9*	*$12,550.9*	*$11,701.9*	***$103,261.2***
(2) Based on population growth in new units of				*7,800*	*9,827*	*10,661*	*10,652*	*10,856*	*11,064*	*11,276*	*11,492*	*10,686*	*10,839*	***105,151***

APPENDIX D.1
TABLE 6 - PAGE 2

REGION OF WATERLOO
CASHFLOW AND DETERMINATION OF DEVELOPMENT CHARGE
WATER
NON-RESIDENTIAL DEVELOPMENT CHARGE

D.1 WATER

OPENING CASH BALANCE FROM APPLICABLE RESERVES	$9,566,978			**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**TOTAL**
OPENING CASH BALANCE ($000)				$9,567.0	$8,887.8	$8,608.2	$8,268.3	$8,036.4	$6,769.3	$5,513.3	$4,519.3	$2,820.9	$1,202.5	
2014-2023 NON-RESIDENTIAL FUNDING REQUIREMENTS														
D.1 WATER - current ($000) (1)				$3,049.0	$2,796.0	$3,468.2	$3,826.6	$5,092.3	$5,198.0	$5,088.8	$5,913.5	$5,920.4	$5,630.3	**$45,983.2**
REVENUE - current ($000)	Rate for 2014													
- Dev. Charge Receipts (2)	$13.19	Inflation:	2.0%	$2,062.1	$2,221.2	$2,844.2	$3,319.3	$3,585.3	$3,745.1	$3,933.6	$4,106.5	$4,249.3	$4,439.1	**$34,505.7**
	Balance:	Positive	Negative											
- Interest on Opening Balance	Rate:	3.5%	5.5%	$334.8	$311.1	$301.3	$289.4	$281.3	$236.9	$193.0	$158.2	$98.7	$42.1	**$2,246.8**
- Interest on In-year Transactions (excl.int.)	Rate:	3.5%	5.5%	($27.1)	($15.8)	($17.2)	($14.0)	($41.4)	($40.0)	($31.8)	($49.7)	($46.0)	($32.8)	**($315.6)**
TOTAL REVENUE ($000)				$2,369.8	$2,516.5	$3,128.3	$3,594.7	$3,825.1	$3,942.1	$4,094.8	$4,215.0	$4,302.1	$4,448.4	**$36,436.8**
CLOSING CASH BALANCE ($000)				$8,887.8	$8,608.2	$8,268.3	$8,036.4	$6,769.3	$5,513.3	$4,519.3	$2,820.9	$1,202.5	$20.6	
WATER CHARGE PER M^2	**$13.19**													
(1) Based on non-residential funding requirements in constant $000 of				*$3,049.0*	*$2,741.2*	*$3,333.5*	*$3,605.9*	*$4,704.5*	*$4,708.0*	*$4,518.7*	*$5,148.0*	*$5,053.0*	*$4,711.2*	***$41,573.1***
(2) Based on non-residential GFA growth in square metres of				*156,335*	*165,097*	*207,257*	*237,141*	*251,116*	*257,167*	*264,815*	*271,036*	*274,962*	*281,611*	***2,366,537***

D.2 WASTEWATER SERVICES

This section provides the background data and analysis undertaken to arrive at the calculated development charge rates for Wastewater services.

The Region is responsible for the provision of Wastewater services for approximately 534,000 people. It currently owns and operates wastewater treatment plants (WWTPs), sewage pumping stations, a biosolids transfer station and storage facility that serves five urban wastewater systems (including three in Cambridge) as well as a number of rural systems. The Region is only responsible for sewage pumping stations that discharge directly to a wastewater treatment plant. It has no responsibility for the remainder of the sewage collection system.

Every year the Region releases a Water and Wastewater Monitoring Report which provides details on its current wastewater flows, commitments to future development, and remaining system capacity to accommodate growth. As with the Water service reviewed above, the *2013 Water and Wastewater Monitoring Report* was a primary source for the analysis of the development-related servicing requirements.

Timing and costs for wastewater treatment plant expansions and other development-related infrastructure are established through master plans, Class Environmental Assessment Studies (Class EAs), and facility pre-design.

TABLE 1 POPULATION FORECASTS

Table 1 provides annual population forecasts for each of the Region's Wastewater service areas to 2031. The forecasts are taken from background data used in the Region's *2013 Water and Wastewater Monitoring Report*. They form the basis of the forecast demand for Water services over the development charge planning period 2014 to 2023 and beyond.

TABLE 2 ALLOCATION OF COSTS AND BENEFITS OF W1 PROJECTS

Although the planning horizon for the purposes of calculating development charges is ten years (2014 - 2023), the Region assesses its capacity requirements for Wastewater services based on a longer term planning horizon to 2031. Table 2 presents the analysis to determine what amount of wastewater treatment plant capacity is required

to meet the needs of growth over the longer period to 2031 for each of the Region's Wastewater systems.

The table shows that sufficient capacity exists in the Elmira, Kitchener, Galt and Preston systems to accommodate all the forecast growth in these service areas to 2031. In the other systems, additional capacity is required to service growth to 2031:

- The recommended approach to providing additional capacity to meet the servicing needs of new development in the *2013 Elmira Wastewater Treatment Master Plan* is to connect the St. Jacobs system to the City of Waterloo collection system treating long term flows at the Waterloo WWTP.

- Expansion of the Waterloo WWTP is planned to start towards the end of the 10 year planning horizon.

- Expansion of the Hespeler WWTP is planned for by 2022.

- The *2013 Water & Wastewater Monitoring Report* identifies that expansion of the Baden/New Hamburg plant may be required between 2017 and 2021 due to flow variation during wet years. This was confirmed in the *Baden & New Hamburg Water & Wastewater Master Plan* completed in 2011, which recommended expansion of the plant by 2018.

- The *2013 Water & Wastewater Monitoring Report* identifies that expansion of the Wellesley plant may be required between 2024 and 2031. The plant currently has 2 modules of 550 m^3 each. The future expansion is expected to be a third 550 m^3 module. The Township of Wellesley is updating its growth plans for the Village of Wellesley which, if approved, could require an earlier expansion of the plant.

It is noted that capital costs to expand the Ayr plant, required to accommodate growth to 2031, have not been included in the Region's 10 year capital plan.

TABLE 3 ALLOCATION OF COSTS AND BENEFITS OF W1 PROJECTS

The *DCA* requires that Regional Council express its intent to provide future capital facilities at the level incorporated in the development charges calculation. Based on the Council approved 10-year capital program, a development-related capital program which sets out those projects that are required to service anticipated development for

the ten year period from 2014 to 2023 and beyond has been prepared. The WW1 projects in the program, i.e. those projects that add capacity to the Wastewater systems, are listed in Table 3, page 1.

Table 3, page 1, provides capital cost estimates and descriptions of the proposed works for each of the planned WW1 projects. For each project, the share of costs attributable to development to 2031 is identified. The development-related allocation for the wastewater treatment plant expansions, additions and upgrades are based on the assessment of additional capacity requirements shown in Table 2.

Table 3, page 2, provides similar details for WW1 projects that, though they have already been built, have been oversized and will provide capacity for growth occurring between 2014 and 2031. Shares of the capital cost to build each project are calculated for development that has occurred to date (based on RDC monies already spent on the works) and development anticipated to occur from 2014-2031. Any remaining capacity is considered to benefit growth beyond 2031 (for example, see the Galt WWTP Process Upgrades and Expansion).

TABLE 4 ALLOCATION OF COSTS AND BENEFITS OF W2 PROJECTS

Table 4, page 1, provides capital cost estimates and descriptions of the proposed works for each of the W2 projects in the development-related capital program. These projects, though they do not add capacity to the Region's Wastewater systems, are required to maintain the quality of the systems. They generally provide benefits to both the existing community as well as development. The development-related share of these projects is based on the ratio of growth that is forecast over the 2014-2031 period to the forecast 2031 serviced population (see Table 1).

The projects listed in Table 4, page 2, have already been built but have been oversized to provide a benefit to growth occurring between 2014 and 2031. The development-related share of these projects is based on the ratio of growth that is forecast over the 2014-2031 period to the forecast 2031 serviced population (see Table 1).

TABLE 5 DEVELOPMENT-RELATED CAPITAL PROGRAM

The entire Wastewater system development-related capital program is summarized in Table 5. The table shows the growth and non-growth shares of capital costs for each project in each year of the ten year planning period 2014 to 2023 and over the entire planning period 2014 to 2031. It is noted that the non-growth costs include benefits to the existing community, post-2031 benefits (if any) and, for previously built facilities, benefits attributable to development that has already occurred (the "prior growth" share). The total cost of the capital program to 2031 which is included in the 2014-2023 program is $1.07 billion, of which $442 million (41%) is deemed development-related and $629 million (59%) is considered non-development related. It is noted that additional projects beyond those included here will be identified in future capital programs to service development to 2031.

TABLE 6 SUMMARY OF COST/BENEFIT ALLOCATION

Table 6 summarizes the allocation of costs and benefits of the development-related capital program over the 10-year development charge planning period and the post-2023 period to 2031. Of the $1.07 billion cost of the entire capital program, $629 million represents a "benefit to existing" cost that must be funded from non-development charge sources.

Of the $442 million development-related capital cost identified in the program, $210 million (47%) is related to development in the 10 year period to 2023 and $232 million (53%) is related to development after 2023. It is anticipated that the "post-2023" costs, including associated financing, will be fully fundable through future development charges. However, interim financing of these costs will likely be required.

The $210 million development-related share for the 2014-2023 period is carried forward to the development charge calculation.

TABLE 7 CALCULATION OF DEVELOPMENT CHARGE

The first step in the determination of the development charge rate is the allocation of the development charge eligible capital cost of $210 million between the residential and the non-residential sectors. As with the Water charge, for Wastewater the

development-related costs have been allocated 71.3% residential ($150 million) and 28.7% non-residential ($60 million). This ratio is based on water use in the IUS for the years 2008, 2009, 2010, and 2012 which is shown in the following table (data for 2011 is unavailable).

IUS (Cambridge, Kitchener, Waterloo) Annual Water Demands (m^3)

Year	Annual Water Use (m^3)			% by Type of Use	
	Residential	ICI	Total	Residential	ICI
2008	32,756,742	13,528,996	46,285,738	70.8%	29.2%
2009	31,795,322	12,115,399	43,910,721	72.4%	27.6%
2010	29,607,465	11,940,324	41,547,789	71.3%	28.7%
2011	n/a	n/a	n/a	n/a	n/a
2012	31,628,696	13,080,336	44,709,032	70.7%	29.3%
4 Year Average (2008, 2009, 2010, & 2012)				**71.3%**	**28.7%**

A cashflow analysis is also undertaken to account for the timing of projects and receipt of development charges. Interest earnings or borrowing costs are, therefore, accounted for in the calculation as allowed under the *DCA*. Based on the development forecast in Appendix A, the analysis calculates the development charge rate that is required to finance the net development-related capital spending plan including provisions for any borrowing costs or interest earnings on the reserve funds. The residential rate is expressed as a development charge per capita (Table 7, page 1). The non-residential rate is expressed as a development charge per square metre of gross floor area (Table 7, page 2).

Principal and interest payments on a 20-year $70 million sinking fund debenture issued by the Region in May, 2013 for development-related Wastewater expenditures associated with the Waterloo Process Upgrades (Project 08809) and Kitchener Process Upgrades (Project 08797) have also been incorporated into the cashflow analysis.

The cashflow analysis is designed so that the closing cash balance at the end of the planning period is as close to nil as possible. Existing Wastewater development charge reserve funds that are available to fund the development-related capital program are accounted for as opening balances in the cashflows. In order to determine appropriate development charge rates reflecting borrowing and earnings necessary to support the net development-related funding requirement, assumptions are used for the inflation rate and interest rate. An inflation rate of 2.0 per cent is used for the funding

requirements and interest rates of 5.5 per cent (negative balance) and 3.5 per cent (positive balance) are used for borrowing/earnings on the funds. This yields effective real discount rates of 3.5 per cent and 1.5 per cent respectively.

As shown in Table 7, pages 1-2 the development-related capital program and forecasted growth result in Wastewater development charges of $1,721.60 per capita for new residential development and of $30.81 per m^2 for new non-residential development.

The following is a summary of the Wastewater development charge rate calculation:

Service	Development-Related Capital Program ($000)		Calculated Development Charge	
	Total 2014-2023	Dev. Charge Recoverable	Residential ($/capita)	Non-Residential ($/$m^2$)
Wastewater	**$1,070,998**	**$209,627**	**$1,721.60**	**$30.81**

APPENDIX D.2
TABLE 1

REGION OF WATERLOO
2014 DEVELOPMENT CHARGES BACKGROUND STUDY
POPULATION BY WASTEWATER SERVICE AREA

Wastewater Service Area	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Kitchener	219,596	221,223	226,106	227,761	231,488	235,729	240,059	244,481	248,995	253,603	258,308	263,112
Waterloo	121,413	124,006	126,029	127,688	131,776	133,592	135,436	137,308	139,207	141,135	143,091	145,077
Galt	82,335	83,071	82,321	82,970	84,412	85,995	87,613	89,265	90,953	92,678	94,440	96,240
Preston	20,646	20,682	20,257	20,409	20,174	20,464	20,758	21,056	21,359	21,667	21,980	22,297
Hespeler	22,166	23,163	24,333	24,646	25,239	25,265	25,292	25,319	25,594	25,982	26,347	26,687
Elmira	9,647	9,652	9,544	9,586	9,869	10,132	10,404	10,685	10,976	11,277	11,589	11,911
St. Jacobs	1,811	1,783	1,735	1,735	1,884	1,919	1,954	1,991	2,028	2,067	2,106	2,145
Baden/New Hamburg	10,742	11,016	11,467	11,773	12,268	12,610	12,965	13,333	13,715	14,112	14,523	14,949
Ayr	4,088	4,195	4,209	4,255	4,658	4,836	5,027	5,233	5,453	5,689	5,943	6,215
Wellesley	2,556	2,700	2,849	2,921	3,191	3,253	3,316	3,380	3,446	3,513	3,582	3,653
TOTAL	495,000	501,491	508,850	513,744	524,959	533,795	542,824	552,051	561,726	571,723	581,909	592,286

Source: Background data to 2013 Water and Wastewater Monitoring Report provided by Region.

Wastewater Service Area	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Kitchener	268,017	273,024	277,936	282,911	287,948	293,050	298,217	303,151	308,167	313,266	318,450	323,719
Waterloo	147,092	149,137	151,118	153,113	155,124	157,151	159,192	161,127	163,085	165,067	167,073	169,103
Galt	98,078	99,957	101,802	103,671	105,566	107,485	109,430	111,289	113,179	115,102	117,057	119,045
Preston	22,620	22,947	23,265	23,585	23,908	24,234	24,562	24,873	25,189	25,508	25,831	26,159
Hespeler	27,002	27,292	27,613	27,935	28,260	28,586	28,914	29,224	29,538	29,855	30,176	30,500
Elmira	12,245	12,590	12,939	13,296	13,662	14,036	14,420	14,793	15,176	15,569	15,972	16,385
St. Jacobs	2,186	2,228	2,268	2,310	2,351	2,394	2,437	2,478	2,520	2,562	2,605	2,649
Baden/New Hamburg	15,392	15,851	16,317	16,796	17,287	17,791	18,308	18,813	19,332	19,865	20,413	20,976
Ayr	6,508	6,822	7,163	7,525	7,907	8,311	8,738	9,178	9,639	10,124	10,633	11,168
Wellesley	3,725	3,799	3,871	3,945	4,019	4,095	4,171	4,244	4,319	4,395	4,472	4,551
TOTAL	602,865	613,647	624,292	635,087	646,032	657,133	668,389	679,171	690,144	701,313	712,682	724,255

Source: Background data to 2013 Water and Wastewater Monitoring Report provided by Region.

Wastewater Service Area	Growth 2014-2031		Share of Growth by Period					
			2014-2023		2024-2031		2024-2041	
	#	%	#	%	#	%	#	%
Kitchener	87,990	27.2%	47,182	53.6%	40,808	46.4%		
Waterloo	35,511	21.0%	19,521	55.0%	15,990	45.0%	24,823	56.0%
Galt	33,050	27.8%	17,676	53.5%	15,374	46.5%		
Preston	5,695	21.8%	3,121	54.8%	2,574	45.2%		
Hespeler	5,235	17.2%	2,670	51.0%	2,565	49.0%	10,598	79.9%
Elmira	6,253	38.2%	3,164	50.6%	3,089	49.4%		
St. Jacobs	730	27.6%	391	53.6%	339	46.4%		
Baden/New Hamburg	8,366	39.9%	4,186	50.0%	4,180	50.0%		
Ayr	6,332	56.7%	2,689	42.5%	3,643	57.5%		
Wellesley	1,298	28.5%	692	53.3%	606	46.7%		
TOTAL	190,460	26.3%	101,292	53.2%	89,168	46.8%		

Notes to Table:

(1) From Region of Waterloo based on background data for the 2013 Water and Wastewater Monitoring Report (WWWMR). Forecasts are based on assumptions regarding the extent and delineation of future service areas.

(2) Regional population estimates are based on Census of Canada data, but additionally include students.

(3) The population estimates in this document are intended only in the context of water and wastewater servicing requirements in the Region as they only reflect occupant data within the mapped bounds of each water and wastewater service area. It is important to note that service area boundaries do not necessarily match municipal settlement area boundaries.

(4) 2024-2041 growth shares have been used to calculate the post-period benefit of the Waterloo and Hespeler expansion projects (see Projects 8316 and 8242 in Appendix D.2, Table 3, Page 1).

APPENDIX D.2
TABLE 2

REGION OF WATERLOO
2014 DEVELOPMENT CHARGES BACKGROUND STUDY
ASSESSMENT OF ADDITIONAL WASTEWATER CAPACITY REQUIRED TO 2031
(all capacities in l/c/d)

		Elmira[4]	St. Jacobs[5]	Waterloo[6]	Kitchener[7]	Hespeler[8]	Galt	Preston[9]	Baden & New Hamburg[10]	Ayr[11]	Wellesley[12]
[1]	Assumed Flow l/c/d[1]	469.8	653.0	381.1	334.0	352.8	461.3	528.1	360.7	327.8	270.2
[2]	2013 Population[2]	10,132	1,919	133,592	235,729	25,265	85,995	20,464	12,610	4,836	3,253
[3]	2023 Population[2]	13,296	2,310	153,113	282,911	27,935	103,671	23,585	16,796	7,525	3,945
[4]	2031 Population[2]	16,385	2,649	169,103	323,719	30,500	119,045	26,159	20,976	11,168	4,551
[5]	Present WWTP Capacity[3]	7,800,000	1,450,000	57,500,000	122,700,000	9,320,000	56,800,000	16,820,000	5,200,000	3,000,000	1,100,000
[6] = [1] x [2]	2013 Total Demand	4,760,014	1,253,107	50,911,911	78,733,486	8,913,492	39,669,494	10,807,038	4,548,427	1,585,241	878,961
[7] = [1] x [3]	2023 Total Demand	6,246,461	1,508,430	58,351,364	94,492,274	9,855,468	47,823,432	12,455,239	6,058,317	2,466,695	1,065,939
[8] = [1] x [4]	2031 Total Demand	7,697,676	1,729,779	64,445,153	108,122,153	10,760,400	54,915,597	13,814,409	7,566,043	3,660,870	1,229,680
[9] = [8] - [6]	Capacity Required to Meet Growth to 2031	2,937,663	476,672	13,533,242	29,388,667	1,846,908	15,246,103	3,007,371	3,017,616	2,075,630	350,720
[10] = [5] - [6]	Excess Capacity[4]	3,039,986	196,893	6,588,089	43,966,514	406,508	17,130,507	6,012,962	651,573	1,414,759	221,039
[11] = [9] / [10] to max of 100%	Percentage of Excess Capacity Required for Growth to 2031	96.6%	100.0%	100.0%	66.8%	100.0%	89.0%	50.0%	100.0%	100.0%	100.0%
[12] = [9] - [10]	Total Net Additional Capacity Required for 2031	--	279,779	6,945,153	--	1,440,400	--	--	2,366,043	660,870	129,680
[13]	Anticipated Capacity Increase from Projects in the Capital Program	--	Note 5	Note 6	--	2,780,000	--	--	2,600,000	1,500,000	550,000
[14] = [12] / [13]	Percentage of Capacity Increase from Projects in the Capital Program for Net Additional Capacity Requirements to 2031	--	Note 5	Note 6	--	Note 8	--	--	Note 10	Note 11	Note 12

Notes:

(1) All per capita flows and current plant capacity are based on the *2013 Water and Wastewater Monitoring Report*. The per capita flows are the average adjusted per capita flows for the past 5 years shown in the report addendum.

(2) Population data from 2013 to 2031 are based on background data prepared for the *2013 Water and Wastewater Monitoring Report*.

(3) Until 2010, adjusted per-capita flows, calculated by using an 85% confidence level, were used in the *Water and Wastewater Monitoring Report* for development planning and approvals. Since 2011, the simple average flows have been used for these calculations. However, adjusted flows are still shown on the report charts for each WWTP especially in systems subject to elevated seasonal fluctuations. To meet plant capacity compliance, expansion and upgrades for these plants may be required earlier than required if the average flows are used.

(4) The *St. Jacobs and Elmira Wastewater Treatment Master Plan* identified that no expansion of the Elmira WWTP is required until 2041.

(5) The *2013 Water & Wastewater Monitoring Report* identifies that expansion of the plant may be required between 2020 and 2031 due to flow variation during wet years. This was confirmed in the *St. Jacobs and Elmira Wastewater Treatment Master Plan* completed in 2013, which recommended expansion of the plant by 2021. The recommended alternative in the *Master Plan* to service growth is the connection of the St. Jacobs system to the City of Waterloo collection system treating long term flows at the Waterloo WWTP.

(6) The *2013 Water & Wastewater Monitoring Report* identifies that expansion of the plant may be required between 2022 and 2029 due to flow variation during wet years. This was confirmed in the *Waterloo and Hespeler Assimilative Capacity Study* completed in 2013, which recommended expansion of the plant by 2024. After 2014, the Waterloo WWTP will also treat flows from the Village of St. Jacobs system.

(7) Ongoing Kitchener WWTP upgrades are required to improve effluent quality (no capacity increase). As identified in the *2007 Wastewater Treatment Master Plan,* this plant should also treat flows from the East Side lands in the long term. A *Master Environmental Servicing Plan* was completed in 2013 for these lands. A Class EA Study is expected to be completed by 2014 for the pumping station connecting the East Side Lands to the Kitchener WWTP.

(8) The *2013 Water & Wastewater Monitoring Report* identifies that expansion of the plant may be required between 2018 and 2026 due to flow variation during wet years. The *Waterloo and Hespeler Assimilative Capacity Study,* completed in 2013, used population projections slightly lower than the *Water & Wastewater Monitoring Report* and recommended a plant expansion no later than 2026. The 2014 capital program plans the completion of the expansion by 2022.

(9) Flows from the industrial area contributing to the Preston WWTP were transferred to the Galt WWTP in 2011. This transferring freed up capacity at the Preston plant to allow the southern part of the East Side Lands to proceed in the short-term. No expansion of the Preston WWTP is planned before 2031.

(10) The *2013 Water & Wastewater Monitoring Report* identifies that expansion of the plant may be required between 2017 and 2021 due to flow variation during wet years. This was confirmed in the *Baden & New Hamburg Water & Wastewater Master Plan* completed in 2011, which recommended expansion of the plant by 2018.

(11) The *2013 Water & Wastewater Monitoring Report* identifies that expansion of the plant may be required between 2027 and 2029. The plant currently has 2 modules of 1,500 m^3 each. The future expansion is expected to be a third 1,500 m^3 module. This expansion is not yet included in the 2014 capital program.

(12) The *2013 Water & Wastewater Monitoring Report* identifies that expansion of the plant may be required between 2024 and 2031. The plant currently has 2 modules of 550 m^3 each. The future expansion is expected to be a third 550 m^3 module. The Township of Wellesley is updating its growth plans for the Village of Wellesley which, if approved, could require an earlier expansion of the plant.

APPENDIX D.2
TABLE 3 - PAGE 1

REGION OF WATERLOO
2014 DEVELOPMENT CHARGES BACKGROUND STUDY
WW1 DEVELOPMENT-RELATED WASTEWATER PROJECTS IN THE CAPITAL FORECAST

Project Name	Project Number	Net Development Related Capital Cost (2013$)	Growth Share 2014-2031	Comments
ELMIRA/ST JACOBS SERVICE AREA				
Elmira Equalization Tanks	8001	$4,600,000	100.0%	Future Equalization Tanks #7 & #8 - These tanks will free up plant capacity that can be used for growth by reducing the effect of I/I at the WWTP.
Woolwich Wastwater MP	8294	$400,000	100.0%	Future update of the MP by 2019/20 - Master Plan to determine wastewater treatment to accommodate future growth in Elmira and St. Jacobs.
St. Jacobs Upgrade (Pumping Station)	8301	$10,000,000	100.0%	New sewage pumping station that will transfer St. Jacobs flows to Waterloo WWTP (see Project 8316 below). This project is being done in lieu of expansion of St. Jacobs WWTP to meet servicing needs of new development.
HESPELER				
Hespeler Process Expansion	8242	$44,350,000	100.0%	Expansion to add capacity for growth to 2041
BADEN & NEW HAMBURG				
Baden & New Hamburg MP Update	8286	$400,000	100.0%	Future update of the MP by 2022/23 - Master Plan to determine wastewater treatment to accommodate future growth in Baden and New Hamburg.
Baden/New Hamburg Expansion	8317	$19,800,000	100.0%	Expansion to add capacity for growth - WWTP expansion to be completed by 2019 and expansion of Pumping Stations and forcemain to be done between 2018 and 2023.
WATERLOO				
Waterloo Process Upgrade	8809	$9,458,000	33.1%	Most of the expansion has been completed and included in Table - "WW1 Growth-Related Wastewater Projects already built and oversized to accommodate future growth" - Costs in this table to be spent in 2014 and 2015
Waterloo Expansion	8316	$122,000,000	100.0%	Expansion to add capacity for growth to 2041
WELLESLEY				
Wellesley Upgrade & Expansion	8267	$10,950,000	100.0%	Expansion to add capacity for growth to 2031
MISCELLANEOUS PLANNING STUDIES				
Wastewater Master Plan Update-2000(replacing 8702)	8779	$1,200,000	100.0%	Future updates of the MP by 2015/16 and 2021/22 - Project to provide growth to the whole Region.
Assimilative Capacity Studies	8318	$1,050,000	100.0%	Studies to identify impact of increase in wastewater flows due to growth on recieving streams
MISCELLANEOUS				
East Side Final PS & Force Main	8302	$15,599,000	100.0%	Project to service future growth on the East Side Lands
Southern Ayr Wastewater System Upgrades	8324	$3,000,000	100.0%	Project to service future growth in Ayr

APPENDIX D.2
TABLE 3 - PAGE 2

REGION OF WATERLOO
2014 DEVELOPMENT CHARGES BACKGROUND STUDY
WW1 DEVELOPMENT-RELATED WASTEWATER PROJECTS ALREADY BUILT AND OVERSIZED TO ACCOMMODATE FUTURE GROWTH

Project Name	Project Number	Net Development-Related Capital Cost [1]	Growth Share from Project Completion - 2013 [2]	Growth Share 2014-2031 [3]	Growth Share Post 2031 [4]	Comments
Elmira & St. Jacobs - I/I Supplementary Program	8731	$6,826,000	0.0%	100.0%	--	Project shared with Township of Woolwich (50/50) - Funds spent from 1997 to 2008 - Agreement to share costs by the Region ends December 31, 2008 - All I/I 100%.
Elmira WWTP Expansion	N/A	$14,491,011	23.7%	73.5%	2.9%	The expansion of the Elmira WWTP was completed in 2001 - Capacity was increased from 4,546 m3/day to 7,800 m3/day.
Galt WWTP Process Upgrades & Expansion (90's)	N/A	$27,990,744	21.3%	70.0%	8.7%	The expansion of the Galt WWTP was completed in 1993 and was constructed to provide capacity to service future growth - Capacity was increased from 38,640 m3/day to 56,800 m3/day.
Ayr WWTP Plant Re-Rating	N/A	$1,366,000	20.7%	79.3%	0.0%	The re-rating and upgrade of the Ayr WWTP was completed in 2002 and was done to provide capacity to service future growth - Capacity was increased from 1,181 m3/day to 1,500 m3/day.
Ayr WWTP Process Upgrades & Expansion	N/A	$8,818,816	27.9%	72.1%	0.0%	The expansion of the Ayr WWTP was completed in 2006 and was constructed to provide capacity to service future growth - Capacity was increased from 1,500 m3/day to 3,000 m3/day.
Baden/New Hamburg Plant Expansion and Conveyance Infrastructure	N/A	$16,249,183	41.7%	58.3%	0.0%	The expansion of the Baden/New Hamburg WWTP was completed in 2000 and was constructed to provide capacity to service future growth. The project also included construction of 2 pumping stations, 1 forcemain and 2 trunk sewers - Capacity was increased from 920 m3/day (Baden WWTP) and 2,300 m3/day (New Hamburg WWTP) to 5,200 m3/day (combined single plant).
St. Jacobs WWTP Expansion	N/A	$5,171,778	29.2%	70.8%	0.0%	The expansion of the St. Jacobs WWTP was completed in 2001 - Capacity was increased from 950 m3/day to 1,450 m3/day.

Notes:
1. Actual construction costs shown.
2. Share of project attributed to development that occurred between project completion and 2013.
3. Share of project required for development between 2014 and 2031.
4. Residual capacity of project attributed to post-2031 development.

APPENDIX D.2
TABLE 4 - PAGE 1

REGION OF WATERLOO
2014 DEVELOPMENT CHARGES BACKGROUND STUDY
WW2 WASTEWATER PROJECTS IN THE CAPITAL FORECAST BENEFITING BOTH GROWTH AND EXISTING COMMUNITY

Project Name	Project Number	Service Area	2013 Population	2031 Population	Population Growth 2014 to 2031	Growth Share [1]	Cost (2013$)	Comments
PLANNING STUDIES								
Biosolids Masterplan Update	8270	Region	533,795	724,255	190,460	26.3%	$1,500,000	Required for improving operation of the Region's WWTPs benefiting existing and future residents
River Sampling Program	8281	Region	533,795	724,255	190,460	26.3%	$4,050,000	Required for improving operation of the Region's WWTPs benefiting existing and future residents
Studies	8288	Region	533,795	724,255	190,460	26.3%	$1,125,000	Required for improving operation of the Region's WWTPs benefiting existing and future residents
Biosolids Class EA	8320	Region	533,795	724,255	190,460	26.3%	$300,000	Required for improving operation of the Region's WWTPs benefiting existing and future residents
Rural Water Quality Program	8750	Region	533,795	724,255	190,460	26.3%	$1,500,000	Required for improving operation of the Region's WWTPs benefiting existing and future residents
INFRASTRUCTURE UPGRADES								
Wastewater Treatment Upgrades	8305	Region	533,795	724,255	190,460	26.3%	$3,850,000	Required to ensure infrastructure sustainability benefiting existing and future residents
Kitchener & Waterloo Infrastructure Upgrades	8307	K/W	369,321	492,822	123,501	25.1%	$24,600,000	Required to ensure infrastructure sustainability benefiting existing and future residents
Cambridge Infrastructure Upgrades	8308	Cambridge	131,724	175,704	43,980	25.0%	$24,436,000	Required to ensure infrastructure sustainability benefiting existing and future residents
Rural Infrastructure Upgrades	8309	Rural	32,750	55,729	22,979	41.2%	$7,600,000	Required to ensure infrastructure sustainability benefiting existing and future residents
Sewage PSs Infrastructure Upgrades	8310	Region	533,795	724,255	190,460	26.3%	$4,150,000	Required to ensure infrastructure sustainability benefiting existing and future residents
UPGRADES, EXPANSIONS & NEW FACILITIES								
Laboratory - Upgrade & Expansion	8278	Region	533,795	724,255	190,460	26.3%	$5,750,000	Required for improving operation of the Region's WWTPs benefiting existing and future residents
SCADA System	8279	Region	533,795	724,255	190,460	26.3%	$10,345,000	Required for improving operation of the Region's WWTPs benefiting existing and future residents
Galt Process Upgrades & Expansion	8289	Galt	85,995	119,045	33,050	27.8%	$14,500,000	Required for improving operation of the Galt WWTP benefiting existing and future residents
Elmira Upgrades	8315	Elmira	10,132	16,385	6,253	38.2%	$6,000,000	Required for improving operation of the Elmira WWTP benefiting existing and future residents
Preston Treatment Plan Upgrades	8323	Preston	20,464	26,159	5,695	21.8%	$2,500,000	Required for improving operation of the Preston WWTP benefiting existing and future residents
Kitchener Process Upgrades	8797	Kitchener	235,729	323,719	87,990	27.2%	$307,842,000	Required for improving operation of the kitchener WWTP benefiting existing and future residents - Total includes all expenditures from 2013 to 2023, and excludes work completed prior to 2013
BIOSOLIDS								
Preston Biosolids Upgrades	8255	Preston	20,464	26,159	5,695	21.8%	$2,921,000	Required for improving future operation of the Preston WWTP benefiting existing and future residents.
Biosolids Management Facility	8275	Region	533,795	724,255	190,460	26.3%	$64,700,000	Required for improving operation of the Region's WWTPs benefiting existing and future residents
Kitchener Biosolids Upgrade	8303	Kitchener	235,729	323,719	87,990	27.2%	$0	
Cogeneration & Other Biosolids Upgrades	8322	Region	533,795	724,255	190,460	26.3%	$25,900,000	Required for improving operation of the Region's WWTPs benefiting existing and future residents

Notes:

1. Growth share is 2014-2031 population growth as proportion of 2031 population.

APPENDIX D.2
TABLE 4 - PAGE 2

REGION OF WATERLOO
2014 DEVELOPMENT CHARGES BACKGROUND STUDY
WW2 WASTEWATER PROJECTS ALREADY BUILT AND BENEFITTING BOTH GROWTH AND EXISTING COMMUNITY

Project Name	Project Number	Service Area	2013 Population	2031 Population	Population Growth from 2014 to 2031	Growth Share[1]	Cost Adjusted for Prior Growth[2]	Comments
Galt New Stand-By Power System	8796	Galt	85,995	119,045	33,050	27.8%	$ 1,465,925	Construction of the Galt New Stand-By Power was completed in 2009 - Required for improving future operation of the Galt WWTP benefiting existing and future residents
Galt Biosolids Upgrade	N/A	Galt	85,995	119,045	33,050	27.8%	$21,436,625	The upgrade of the biosolids system at Galt WWTP was completed in 2008 and was constructed to improve the plant operation benefiting existing and future residents
Preston WWTP Process Upgrades & Expansion	N/A	Preston	20,464	26,159	5,695	21.8%	$11,085,040	The upgrade of the Preston WWTP was completed in 2001 - All work was to improve effluent quality with no capacity increase benefiting existing and future residents

Notes:
1. Growth share is 2014-2031 population growth as proportion of 2031 population.
2. Growth-related costs adjusted to account for RDC funds already spent on project.

APPENDIX D.2
TABLE 5

REGION OF WATERLOO
2014 DEVELOPMENT CHARGES STUDY
DEVELOPMENT-RELATED CAPITAL FORECAST

WASTEWATER

($000)

Proj. #	DESCRIPTION	TYPE	Growth Share	Carry-Forward	Base 2014	2014 Growth	2014 Benefit to Existing	2015 Growth	2015 Benefit to Existing	2016 Growth	2016 Benefit to Existing	2017 Growth	2017 Benefit to Existing	2018 Growth	2018 Benefit to Existing	2019 Growth	2019 Benefit to Existing	2020 Growth	2020 Benefit to Existing	2021 Growth	2021 Benefit to Existing	2022 Growth	2022 Benefit to Existing	2023 Growth	2023 Benefit to Existing	TOTAL Growth 2014 2023	TOTAL Benefit to Existing	TOTAL Total
	PLANNING & STUDIES																											
8270	Biosolids Masterplan Update	WW2	26.3%		*200*	53	147	79	221	79	221	53	147							39	111	66	184	26	74	394	1,106	1,500
8281	River Sampling Program	WW2	26.3%	*50*	*400*	118	332	105	295	105	295	105	295	105	295	105	295	105	295	105	295	105	295	105	295	1,065	2,985	4,050
8286	Baden & New Hamburg MP Update	WW1	100.0%																			200		200		400		400
8288	Studies	WW2	26.3%	*25*	*200*	59	166	26	74	26	74	26	74	26	74	26	74	26	74	26	74	26	74	26	74	296	829	1,125
8294	Woolwich Wastwater MP	WW1	100.0%													200		200								400		400
8318	Assimilative Capacity Studies	WW1	100.0%	*50*		50				250		250								250		250				1,050		1,050
8320	Biosolids Class EA	WW2	26.3%					26	74	53	147															79	221	300
8750	Rural Water Quality Program	WW2	26.3%		*100*	26	74	53	147	39	111	39	111	39	111	39	111	39	111	39	111	39	111	39	111	394	1,106	1,500
8779	Wastewater Master Plan Update-2000(replacing 8702)	WW1	100.0%					300		300										300		300				1,200		1,200
	TOTAL PLANNING & STUDIES			*125*	*900*	**306**	**719**	**589**	**811**	**852**	**848**	**474**	**626**	**171**	**479**	**371**	**479**	**371**	**479**	**760**	**590**	**987**	**663**	**397**	**553**	**5,279**	**6,246**	**11,525**
	INFRASTRUCTURE UPGRADES																											
8305	Wastewater Treatment Upgrades	WW2	26.3%	*50*	*300*	92	258	79	221	79	221	79	221	79	221	79	221	131	369	131	369	131	369	131	369	1,012	2,838	3,850
8307	Kitchener & Waterloo Infrastructure Upgrades	WW2	25.1%	*600*	*1,000*	401	1,199	251	749	251	749	752	2,248	752	2,248	752	2,248	752	2,248	752	2,248	752	2,248	752	2,248	6,165	18,435	24,600
8308	Cambridge Infrastructure Upgrades	WW2	25.0%	*900*	*1,636*	635	1,901	476	1,424	250	750	501	1,499	501	1,499	751	2,249	751	2,249	751	2,249	751	2,249	751	2,249	6,117	18,319	24,436
8309	Rural Infrastructure Upgrades	WW2	41.2%	*1,500*		619	881	247	353	206	294	206	294	206	294	206	294	206	294	412	588	412	588	412	588	3,134	4,466	7,600
8310	Sewage PSs Infrastructure Upgrades	WW2	26.3%	*195*	*55*	66	184	79	221	79	221	79	221	131	369	131	369	131	369	131	369	131	369	131	369	1,091	3,059	4,150
	TOTAL INFRASTRUCTURE UPGRADES			*3,245*	*2,991*	**1,812**	**4,424**	**1,131**	**2,969**	**865**	**2,235**	**1,616**	**4,484**	**1,669**	**4,631**	**1,919**	**5,381**	**1,972**	**5,528**	**2,178**	**5,822**	**2,178**	**5,822**	**2,178**	**5,822**	**17,519**	**47,117**	**64,636**
	UPGRADES, EXPANSIONS & NEW FACILITIES																											
8001	Elmira Equalization Tanks	WW1	100.0%													200		1,500		1,500		1,400				4,600		4,600
8242	Hespeler Process Expansion	WW1	100.0%	*50*		50		300		500		500		8,000		12,000		12,000		7,000		4,000				44,350		44,350
8267	Wellesley Upgrade & Expansion	WW1	100.0%							100		250		300		300		2,000		2,000		3,000		3,000		10,950		10,950
8278	Laboratory - Upgrade & Expansion	WW2	26.3%	*250*		66	184					131	369	789	2,211	526	1,474									1,512	4,238	5,750
8279	SCADA System	WW2	26.3%	*311*	*334*	170	475	342	958	342	958	237	663	342	958	263	737	237	663	263	737	263	737	263	737	2,720	7,625	10,345
8289	Galt Process Upgrades & Expansion	WW2	27.8%		*300*	83	217	777	2,023	583	1,517	1,055	2,745	1,111	2,889	416	1,084									4,026	10,474	14,500
8301	St. Jacobs Upgrade (Pumping Station)	WW1	100.0%							100		100		400		400		1,000		1,000		3,000		4,000		10,000		10,000
8302	East Side Final PS & Force Main	WW1	100.0%	*49*	*250*	299		300		2,000		3,000		3,000		3,000		1,000		1,000		1,000		1,000		15,599		15,599
8315	Elmira Upgrades	WW2	38.2%													191	309	382	618	572	928	572	928	572	928	2,290	3,710	6,000
8316	Waterloo Expansion	WW1	100.0%							500		500		1,000		10,000		10,000		30,000		30,000		40,000		122,000		122,000
8317	Baden/New Hamburg Expansion	WW1	100.0%	*59*	*241*	300		300		300		2,400		4,500		4,400		1,000		1,800		2,400		2,400		19,800		19,800
8323	Preston Treatment Plan Upgrades	WW2	21.8%		*200*	44	156	327	1,173	174	626															544	1,956	2,500
8324	Southern Ayr Wastewater System Upgrades	WW1	100.0%		*300*	300		1,600		1,100																3,000		3,000
8797	Kitchener Process Upgrades	WW2	27.2%	*15,171*	*6,319*	5,841	15,649	10,764	28,836	16,716	44,784	16,173	43,327	8,906	23,859	3,763	10,082	10,813	28,967	4,675	12,525	3,306	8,856	2,718	7,282	83,674	224,168	307,842
8809	Waterloo Process Upgrade	WW1	33.1%	*108*	*4,500*	1,525	3,083	1,606	3,244																	3,131	6,327	9,458
	TOTAL UPGRADES, EXPANSIONS & NEW FACILITIES			*15,998*	*12,444*	**8,678**	**19,764**	**16,315**	**36,235**	**22,415**	**47,885**	**24,346**	**47,104**	**28,347**	**29,918**	**35,459**	**13,686**	**39,931**	**30,249**	**49,811**	**14,189**	**48,941**	**10,521**	**53,954**	**8,946**	**328,197**	**258,497**	**586,694**
	BIOSOLIDS																											
8255	Preston Biosolids Upgrades	WW2	21.8%	*1,996*	*125*	462	1,659	174	626																	636	2,285	2,921
8275	Biosolids Management Facility	WW2	26.3%		*200*	53	147	53	147	79	221	263	737	789	2,211	1,315	3,685	2,630	7,370	3,945	11,055	3,945	11,055	3,945	11,055	17,014	47,686	64,700
8303	Kitchener Biosolids Upgrade	WW2	27.2%																									
8322	Cogeneration & Other Biosolids Upgrades	WW2	26.3%					26	74	53	147	158	442	552	1,548	1,499	4,201	1,762	4,938	1,183	3,317	1,052	2,948	526	1,474	6,811	19,089	25,900
	TOTAL BIOSOLIDS			*1,996*	*325*	**514**	**1,807**	**253**	**847**	**131**	**369**	**421**	**1,179**	**1,341**	**3,759**	**2,814**	**7,886**	**4,392**	**12,308**	**5,128**	**14,372**	**4,996**	**14,004**	**4,471**	**12,529**	**24,461**	**69,060**	**93,521**
	OTHER RECOVERABLE PROJECTS (PRIOR OVERSIZED PROJECTS)																											
8731	Elmira & St. Jacobs - I/I Supplementary Program	WW1	100.0%		*683*	683	0	683	0	683	0	683	0	683	0	683	0	683	0	683	0	683	0	683	0	6,825	1	6,826
N/A	Elmira WWTP Expansion	WW1	73.5%		*1,449*	1,065	384	1,065	384	1,065	384	1,065	384	1,065	384	1,065	384	1,065	384	1,065	384	1,065	384	1,065	384	10,648	3,843	14,491
N/A	Galt WWTP Process Upgrades & Expansion (90's)	WW1	70.0%		*2,799*	1,961	838	1,961	838	1,961	838	1,961	838	1,961	838	1,961	838	1,961	838	1,961	838	1,961	838	1,961	838	19,607	8,383	27,991
N/A	Galt Biosolids Upgrade	WW2	27.8%		*2,144*	595	1,549	595	1,549	595	1,549	595	1,549	595	1,549	595	1,549	595	1,549	595	1,549	595	1,549	595	1,549	5,951	15,485	21,437
N/A	Preston WWTP Process Upgrades & Expansion (90's)	WW2	21.8%		*1,109*	241	867	241	867	241	867	241	867	241	867	241	867	241	867	241	867	241	867	241	867	2,413	8,672	11,085
N/A	Ayr WWTP Plant Re-Rating	WW1	79.3%		*137*	108	28	108	28	108	28	108	28	108	28	108	28	108	28	108	28	108	28	108	28	108	28	1,084	282	1,366
N/A	Ayr WWTP Process Upgrades & Expansion	WW1	72.1%		*882*	636	246	636	246	636	246	636	246	636	246	636	246	636	246	636	246	636	246	636	246	636	246	6,363	2,456	8,819
N/A	Baden/New Hamburg Plant Expansion and Conveyance Infrastructure	WW1	58.3%		*1,625*	948	677	948	677	948	677	948	677	948	677	948	677	948	677	948	677	948	677	948	677	948	677	9,475	6,774	16,249
N/A	St. Jacobs WWTP Expansion	WW1	70.8%		*517*	366	151	366	151	366	151	366	151	366	151	366	151	366	151	366	151	366	151	366	151	366	151	3,660	1,512	5,172
8796	Galt New Stand-By Power System	WW2	27.8%		*147*	41	106	41	106	41	106	41	106	41	106	41	106	41	106	41	106	41	106	41	106	407	1,059	1,466
	TOTAL OTHER RECOVERABLE PROJECTS				*31,462*	**6,643**	**24,819**	**6,643**	**24,819**	**6,643**	**24,819**	**6,643**	**24,819**	**6,643**	**24,819**	**6,643**	**24,819**	**6,643**	**24,819**	**6,643**	**24,819**	**6,643**	**24,819**	**6,643**	**24,819**	**6,643**	**24,819**	**66,434**	**248,188**	**314,622**
	TOTAL WASTEWATER			**21,364**	**48,122**	**17,954**	**51,532**	**24,932**	**65,680**	**30,907**	**76,155**	**33,500**	**78,212**	**38,172**	**63,606**	**47,207**	**52,250**	**53,309**	**73,383**	**64,520**	**59,792**	**63,746**	**55,828**	**67,643**	**52,669**	**441,889**	**629,109**	**1,070,998**

Note: Non-growth costs include benefit to existing community

APPENDIX D.2
TABLE 6

REGION OF WATERLOO
2014 DEVELOPMENT CHARGES BACKGROUND STUDY
SUMMARY OF WASTEWATER DEVELOPMENT-RELATED PROGRAM COST ALLOCATION

PROGRAM	Total Cost	Non-Growth Cost[1]	Development-Related Cost		
			Total	2014-2023	Post-2023
	($000)				
PLANNING & STUDIES	$ 11,525	$ 6,246	$ 5,279	$ 5,279	$ -
INFRASTRUCTURE UPGRADES	$ 64,636	$ 47,117	$ 17,519	$ 9,229	$ 8,290
UPGRADES, EXPANSIONS & NEW FACILITIES	$ 586,694	$ 258,497	$ 328,197	$ 148,164	$ 180,033
BIOSOLIDS	$ 93,521	$ 69,060	$ 24,461	$ 13,020	$ 11,442
OTHER RECOVERABLE PROJECTS (PRIOR OVERSIZED PROJECTS)	$ 314,622	$ 248,188	$ 66,434	$ 33,936	$ 32,498
TOTAL WASTEWATER DEVELOPMENT-RELATED CAPITAL PROGRAM	**$ 1,070,998**	**$ 629,109**	**$ 441,889**	**$ 209,627**	**$ 232,263**

Note: 1. Non-growth cost includes benefit to existing community and, for previously built facilities, include prior-growth shares of project costs.

APPENDIX D.2
TABLE 7 - PAGE 1

REGION OF WATERLOO
CASHFLOW AND DETERMINATION OF DEVELOPMENT CHARGE
WASTEWATER
RESIDENTIAL DEVELOPMENT CHARGE

D.2 WASTEWATER

OPENING CASH BALANCE FROM APPLICABLE RESERVES	$748,794			**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**TOTAL**
OPENING CASH BALANCE ($000)				$748.8	$3,777.2	$7,957.7	$11,511.8	$14,345.1	$18,007.2	$20,158.4	$20,170.4	$15,719.7	$8,838.8	
2014-2023 RESIDENTIAL FUNDING REQUIREMENTS														
D.2 WASTEWATER - current ($000) (1)				$6,795.8	$9,595.4	$12,193.5	$13,389.5	$13,442.1	$15,853.1	$18,854.4	$24,062.5	$25,105.1	$27,512.3	**$166,803.9**
Debt Repayment - Interest				$1,871.5	$1,871.5	$1,871.5	$1,871.5	$1,871.5	$1,871.5	$1,871.5	$1,871.5	$1,871.5	$1,871.5	**$18,715.2**
Debt Repayment - Principal				$1,810.6	$1,810.6	$1,810.6	$1,810.6	$1,810.6	$1,810.6	$1,810.6	$1,810.6	$1,810.6	$1,810.6	**$18,105.8**
Total Wastewater Funding Requirements				$10,477.9	$13,277.5	$15,875.6	$17,071.6	$17,124.2	$19,535.2	$22,536.5	$27,744.6	$28,787.2	$31,194.4	**$203,624.9**
POPULATION GROWTH	Rate for 2014													
- Dev. Charge Receipts (2)	$1,721.60	Inflation	2.0%	$13,428.4	$17,256.2	$19,094.9	$19,460.2	$20,229.9	$21,030.0	$21,861.6	$22,725.9	$21,555.0	$22,300.6	**$198,942.7**
	Balance:	Positive	Negative											
- Interest on Opening Balance	Rate:	3.5%	5.5%	$26.2	$132.2	$278.5	$402.9	$502.1	$630.3	$705.5	$706.0	$550.2	$309.4	**$4,243.2**
- Interest on In-year Transactions (excl.int.)	Rate:	3.5%	5.5%	$51.6	$69.6	$56.3	$41.8	$54.4	$26.2	($18.6)	($138.0)	($198.9)	($244.6)	**($300.1)**
TOTAL REVENUE ($000)				$13,506.2	$17,458.0	$19,429.8	$19,904.9	$20,786.3	$21,686.4	$22,548.6	$23,293.9	$21,906.3	$22,365.4	**$202,885.8**
CLOSING CASH BALANCE ($000)				$3,777.2	$7,957.7	$11,511.8	$14,345.1	$18,007.2	$20,158.4	$20,170.4	$15,719.7	$8,838.8	$9.7	
WASTEWATER PER CAPITA CHARGE	**$1,721.60**													
(1) Based on residential funding requirements in constant $000 of				*$6,795.8*	*$9,407.3*	*$11,720.0*	*$12,617.3*	*$12,418.4*	*$14,358.7*	*$16,742.2*	*$20,947.8*	*$21,427.0*	*$23,021.1*	***$149,455.6***
(2) Based on population growth in new units of				*7,800*	*9,827*	*10,661*	*10,652*	*10,856*	*11,064*	*11,276*	*11,492*	*10,686*	*10,839*	***105,151***

APPENDIX D.2
TABLE 7 - PAGE 2

REGION OF WATERLOO
CASHFLOW AND DETERMINATION OF DEVELOPMENT CHARGE
WASTEWATER
NON-RESIDENTIAL DEVELOPMENT CHARGE

D.2 WASTEWATER

OPENING CASH BALANCE FROM APPLICABLE RESERVES	$301,466			**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**TOTAL**
OPENING CASH BALANCE ($000)				$301.5	$946.7	$845.9	$1,157.9	$2,120.2	$3,726.8	$4,781.7	$5,092.1	$3,689.8	$2,150.0	
2014-2023 NON-RESIDENTIAL FUNDING REQUIREMENTS														
D.2 WASTEWATER - current ($000) (1)				$2,736.0	$3,863.1	$4,909.1	$5,390.6	$5,411.8	$6,382.5	$7,590.8	$9,687.6	$10,107.4	$11,076.5	**$67,155.5**
Debt Repayment - Interest				$753.5	$753.5	$753.5	$753.5	$753.5	$753.5	$753.5	$753.5	$753.5	$753.5	**$7,534.8**
Debt Repayment - Principal				$728.9	$728.9	$728.9	$728.9	$728.9	$728.9	$728.9	$728.9	$728.9	$728.9	**$7,289.4**
Total Wastewater Funding Requirements				$4,218.4	$5,345.6	$6,391.5	$6,873.1	$6,894.2	$7,864.9	$9,073.2	$11,170.0	$11,589.8	$12,558.9	**$81,979.7**
REVENUE - current ($000)	Rate for 2014													
- Dev. Charge Receipts (2)	$30.81	Inflation:	2.0%	$4,816.7	$5,188.4	$6,643.6	$7,753.5	$8,374.7	$8,748.0	$9,188.3	$9,592.2	$9,925.8	$10,369.1	**$80,600.3**
	Balance:	Positive	Negative											
- Interest on Opening Balance	Rate:	3.5%	5.5%	$10.6	$33.1	$29.6	$40.5	$74.2	$130.4	$167.4	$178.2	$129.1	$75.3	**$868.4**
- Interest on In-year Transactions (excl.int.)	Rate:	3.5%	5.5%	$36.4	$23.2	$30.4	$41.3	$51.9	$41.4	$28.0	($2.6)	($5.0)	($19.5)	**$225.4**
TOTAL REVENUE ($000)				$4,863.7	$5,244.7	$6,703.6	$7,835.4	$8,500.8	$8,919.8	$9,383.6	$9,767.8	$10,050.0	$10,424.9	**$81,694.2**
CLOSING CASH BALANCE ($000)				$946.7	$845.9	$1,157.9	$2,120.2	$3,726.8	$4,781.7	$5,092.1	$3,689.8	$2,150.0	$16.0	
WASTEWATER CHARGE PER M^2	**$30.81**													
(1) Based on non-residential funding requirements in constant $000 of				*$2,736.0*	*$3,787.4*	*$4,718.5*	*$5,079.7*	*$4,999.7*	*$5,780.8*	*$6,740.4*	*$8,433.6*	*$8,626.5*	*$9,268.3*	***$60,171.0***
(2) Based on non-residential GFA growth in square metres of				*156,335*	*165,097*	*207,257*	*237,141*	*251,116*	*257,167*	*264,815*	*271,036*	*274,962*	*281,611*	***2,366,537***

APPENDIX E

RESERVE FUNDS

APPENDIX E
TABLE 1

REGION OF WATERLOO
DEVELOPMENT CHARGE RESERVE FUND BALANCES BY ACCOUNT
YEAR ENDING DECEMBER 31, 2013

CATEGORY	Uncommitted Reserve Fund Balance as at Dec. 31, 2013	Committed Excess Capacity Outside Reserve Funds	Committed Excess Capacity to be Funded From DCs
LIBRARY SERVICES	$ 75,469	$ -	$ -
WATERLOO REGIONAL POLICE SERVICE	$ (374,374)	$ (6,371,175)	$ (6,745,549)
EMERGENCY MEDICAL SERVICES	$ (205,011)	$ -	$ (205,011)
AIRPORT	$ (2,158,475)	$ -	$ (2,158,475)
TRANSIT	$ (2,552,581)	$ -	$ (2,552,581)
OPERATIONS AND FACILITIES	$ 1,900,852	$ -	$ -
GENERAL GOVERNMENT	$ (697,047)	$ -	$ (697,047)
SUB-TOTAL GENERAL SERVICES	$ (4,011,167)	$ (6,371,175)	$ (12,358,663)
TRANSPORTATION	$ 37,521,009	$ -	$ -
WATER	$ 33,329,880	$ -	$ -
WASTEWATER	$ 1,050,260	$ -	$ -
SUBTOTAL ENGINEERING SERVICES	**$ 71,901,149**	**$ -**	**$ -**
TOTAL ALL SERVICES	**$ 67,889,982**	**$ (6,371,175)**	**$ (12,358,663)**

Based on Region of Waterloo 2013 final reserve reconciliations.

Note. Uncommitted reserve fund balances are accounted for in the cashflow analysis. Committed excess capacity for Waterloo Regional Police Service are being funded as projects in the development-related capital program (see Appendix B).

APPENDIX F

LONG TERM CAPITAL AND OPERATING COST IMPACT ANALYSIS

APPENDIX F
TABLE 1

REGION OF WATERLOO
ESTIMATED NET OPERATING COST OF PROPOSED
DEVELOPMENT-RELATED CAPITAL PROGRAM
(in constant 2014 dollars)

	2014 Operating Cost Per Household	Net Cost per New Household	Estimated Operating Costs ($000) 2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
REGIONAL LIBRARY	$73 per new household	$37 per new household	$16.0	$33.2	$50.4	$72.0	$95.2	$118.6	$142.4	$165.5	$187.6	$209.7
WATERLOO REGIONAL POLICE SERVICE	$578 per new household	$289 per new household	$963.8	$2,056.2	$3,272.1	$4,563.7	$5,883.2	$7,231.1	$8,607.9	$10,014.4	$11,323.4	$12,655.1
EMERGENCY MEDICAL SERVICES	$49 per new household	$25 per new household	$81.7	$174.3	$277.4	$386.9	$498.8	$613.0	$729.7	$849.0	$959.9	$1,072.8
AIRPORT	$25 per new household	$13 per new household	$41.7	$88.9	$141.5	$197.4	$254.5	$312.8	$372.3	$433.2	$489.8	$547.4
TRANSIT	$234 per new household	$117 per new household	$339.1	$726.0	$1,163.1	$1,616.8	$2,076.5	$2,547.2	$3,028.6	$3,523.8	$3,982.7	$4,451.0
OPERATIONS FACILITIES	$20 per new household	$10 per new household	$33.4	$71.2	$113.2	$157.9	$203.6	$250.2	$297.9	$346.5	$391.8	$437.9
GENERAL GOVERNMENT	no new net tax levy expenditure impacts		$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
TRANSPORTATION	$84 per new household	$42 per new household	$140.1	$298.8	$475.5	$663.2	$855.0	$1,050.9	$1,251.0	$1,455.4	$1,645.6	$1,839.1
WATER AND WASTEWATER	no new net tax levy expenditure impacts		$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
TOTAL ESTIMATED OPERATING COSTS ($000)			**$1,615.6**	**$3,448.7**	**$5,493.2**	**$7,658.0**	**$9,866.8**	**$12,123.8**	**$14,429.8**	**$16,787.8**	**$18,980.9**	**$21,213.1**

Note. Operating cost impacts based on 2014 operating budget.

Based on:										
Region										
Annual HH Growth	*3,335*	*3,780*	*4,207*	*4,470*	*4,566*	*4,664*	*4,764*	*4,867*	*4,529*	*4,608*
Cumulative HH Growth	*3,335*	*7,115*	*11,322*	*15,792*	*20,357*	*25,021*	*29,785*	*34,652*	*39,181*	*43,789*
Urban Areas										
Annual HH Growth	2,898	3,307	3,736	3,878	3,930	4,023	4,114	4,233	3,922	4,003
Cumulative HH Growth	*2,898*	*6,205*	*9,941*	*13,819*	*17,748*	*21,771*	*25,885*	*30,118*	*34,040*	*38,043*
Townships										
Annual HH Growth	437	473	471	592	636	641	650	634	607	605
Cumulative HH Growth	*437*	*910*	*1,381*	*1,973*	*2,609*	*3,250*	*3,900*	*4,534*	*5,141*	*5,746*

APPENDIX F
TABLE 2 - PAGE 1

REGION OF WATERLOO
SUMMARY OF TAX SUPPORTED FUNDING REQUIREMENTS

Net Capital Cost of Growth Related Projects REGION-WIDE GENERAL SERVICES	2014 ($000)	2015 ($000)	2016 ($000)	2017 ($000)	2018 ($000)	2019 ($000)	2020 ($000)	2021 ($000)	2022 ($000)	2023 ($000)	TOTAL ($000)
REGIONAL LIBRARY											
Total Net Cost (1)	130.0	130.0	130.0	130.0	130.0	130.0	130.0	130.0	130.0	130.0	1,300.0
Net Cost From Development Charges (2)	117.0	117.0	117.0	117.0	117.0	117.0	117.0	117.0	117.0	117.0	1,170.0
Net Cost From Non-DC Sources	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	130.0
- Discount Portion (3)	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	130.0
- Replacement/Benefit to Existing	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
- For Post 2023 Growth (4)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WATERLOO REGIONAL POLICE SERVICE											
Total Net Cost (1)	2,486.3	4,125.8	816.3	672.8	816.3	601.4	744.9	601.4	744.9	601.4	12,211.7
Net Cost From Development Charges (2)	1,594.3	3,638.3	816.3	672.8	816.3	601.4	744.9	601.4	744.9	601.4	10,832.2
Net Cost From Non-DC Sources	892.0	487.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1,379.5
- Discount Portion (3)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
- Replacement/Benefit to Existing	892.0	487.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1,379.5
- For Post 2023 Growth (4)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
EMERGENCY MEDICAL SERVICES											
Total Net Cost (1)	1,435.4	153.0	816.7	923.2	3,266.7	759.9	0.0	161.0	0.0	0.0	7,515.9
Net Cost From Development Charges (2)	1,291.9	137.7	735.0	830.9	659.7	0.0	0.0	0.0	0.0	0.0	3,655.2
Net Cost From Non-DC Sources	143.5	15.3	81.7	92.3	2,606.9	759.9	0.0	161.0	0.0	0.0	3,860.7
- Discount Portion (3)	143.5	15.3	81.7	92.3	326.7	76.0	0.0	16.1	0.0	0.0	751.6
- Replacement/Benefit to Existing	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
- For Post 2023 Growth (4)	0.0	0.0	0.0	0.0	2,280.3	683.9	0.0	144.9	0.0	0.0	3,109.1
AIRPORT											
Total Net Cost (1)	2,217.0	3,825.0	5,800.0	1,130.0	11,725.0	165.0	0.0	350.0	11,000.0	0.0	36,212.0
Net Cost From Development Charges (2)	1,187.5	2,317.5	5,107.5	382.5	5,276.3	148.5	0.0	31.5	450.0	0.0	14,901.2
Net Cost From Non-DC Sources	1,029.5	1,507.5	692.5	747.5	6,448.8	16.5	0.0	318.5	10,550.0	0.0	21,310.8
- Discount Portion (3)	131.9	257.5	567.5	42.5	586.3	16.5	0.0	3.5	1,050.0	0.0	2,655.7
- Replacement/Benefit to Existing	897.6	1,250.0	125.0	705.0	5,862.5	0.0	0.0	315.0	500.0	0.0	9,655.1
- For Post 2023 Growth (4)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9,000.0	0.0	9,000.0
TRANSIT											
Total Net Cost (1)	27,580.3	12,879.3	9,231.3	11,805.0	28,400.0	29,453.0	5,475.0	4,975.0	475.0	475.0	130,749.0
Net Cost From Development Charges (2)	22,128.7	1,673.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	23,802.6
Net Cost From Non-DC Sources	5,451.6	11,205.4	9,231.3	11,805.0	28,400.0	29,453.0	5,475.0	4,975.0	475.0	475.0	106,946.4
- Discount Portion (3)	2,458.7	863.4	683.2	1,104.9	2,793.9	2,903.6	505.8	455.8	5.8	5.8	11,780.8
- Replacement/Benefit to Existing	2,992.9	4,244.9	2,399.8	755.6	461.3	417.3	417.3	417.3	417.3	417.3	12,941.3
- For Post 2023 Growth (4)	0.0	6,097.1	6,148.4	9,944.4	25,144.9	26,132.1	4,551.9	4,101.9	51.9	51.9	82,224.4
OPERATIONS FACILITIES											
Total Net Cost (1)	2,620.8	9,842.8	13,542.3	3,367.0	5,651.8	13,301.8	15,341.8	6,161.8	41.8	41.8	69,913.7
Net Cost From Development Charges (2)	418.4	1,518.8	2,443.7	735.9	287.1	669.6	771.6	312.6	6.6	6.6	7,170.7
Net Cost From Non-DC Sources	2,202.4	8,324.0	11,098.6	2,631.1	5,364.7	12,632.2	14,570.2	5,849.2	35.2	35.2	62,743.0
- Discount Portion (3)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
- Replacement/Benefit to Existing	2,202.4	8,324.0	11,098.6	2,631.1	5,364.7	12,632.2	14,570.2	5,849.2	35.2	35.2	62,743.0
- For Post 2023 Growth (4)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GENERAL GOVERNMENT											
Total Net Cost (1)	1,223.0	480.0	615.0	285.0	500.0	200.0	200.0	200.0	500.0	200.0	4,403.0
Net Cost From Development Charges (2)	1,100.7	432.0	553.5	256.5	450.0	180.0	180.0	180.0	450.0	180.0	3,962.7
Net Cost From Non-DC Sources	122.3	48.0	61.5	28.5	50.0	20.0	20.0	20.0	50.0	20.0	440.3
- Discount Portion (3)	122.3	48.0	61.5	28.5	50.0	20.0	20.0	20.0	50.0	20.0	440.3
- Replacement/Benefit to Existing	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
- For Post 2023 Growth (4)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Notes: (1) For total growth related capital forecast see Appendix B.

(2) Share of capital program to be funded from development charges should calculated rates be fully implemented.

(3) Mandatory 10% reduction for applicable services.

(4) Post 2023 growth related net capital costs may be eligible for development charges in future DC by-laws, but interim financing of this share may be required.

APPENDIX F
TABLE 2 - PAGE 2

REGION OF WATERLOO
SUMMARY OF TAX SUPPORTED FUNDING REQUIREMENTS

Net Capital Cost of Growth Related Projects REGION-WIDE ENGINEERED SERVICES	2014 ($000)	2015 ($000)	2016 ($000)	2017 ($000)	2018 ($000)	2019 ($000)	2020 ($000)	2021 ($000)	2022 ($000)	2023 ($000)	TOTAL ($000)
TRANSPORTATION											
Total Net Cost (1)	92,851.7	72,999.7	79,501.7	53,330.0	66,770.0	32,650.0	35,340.0	13,355.0	39,964.1	36,920.0	523,682.1
Net Cost From Development Charges (2)	79,369.2	66,668.4	77,412.7	52,182.5	66,233.8	32,623.8	35,340.0	13,355.0	39,964.1	36,920.0	500,069.4
Net Cost From Non-DC Sources	13,482.5	6,331.3	2,089.0	1,147.5	536.3	26.3	0.0	0.0	0.0	0.0	23,612.8
- Discount Portion (3)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
- Replacement/Benefit to Existing	13,482.5	6,331.3	2,089.0	1,147.5	536.3	26.3	0.0	0.0	0.0	0.0	23,612.8
- For Post 2023 Growth (4)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WATER (LESS PRIOR OVERSIZED)											
Total Net Cost (1)	32,326.0	27,090.0	32,285.0	39,060.0	52,015.0	57,700.0	52,990.0	59,880.0	57,775.0	51,585.0	462,706.0
Net Cost From Development Charges (2)	7,798.7	6,726.3	8,790.0	9,738.9	13,566.2	13,578.4	12,918.8	15,111.4	14,780.4	13,589.6	116,598.6
Net Cost From Non-DC Sources	24,527.3	20,363.7	23,495.0	29,321.1	38,448.8	44,121.6	40,071.2	44,768.6	42,994.6	37,995.4	346,107.4
- Discount Portion (3)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
- Replacement/Benefit to Existing	19,458.8	15,750.7	16,890.4	21,955.1	27,805.2	33,774.3	30,183.3	33,669.3	32,170.6	28,198.8	259,856.5
- For Post 2023 Growth (4)	5,068.5	4,613.0	6,604.6	7,366.1	10,643.6	10,347.3	9,887.8	11,099.3	10,824.0	9,796.6	86,250.9
WASTEWATER (LESS PRIOR OVERSIZED)											
Total Net Cost (1)	38,024.0	59,150.0	75,600.0	80,250.0	70,315.0	67,995.0	95,230.0	92,850.0	88,112.0	88,850.0	756,376.0
Net Cost From Development Charges (2)	6,138.2	9,801.1	13,044.9	14,303.4	14,024.5	16,745.9	20,089.0	25,987.9	26,660.0	28,895.8	175,690.7
Net Cost From Non-DC Sources	31,885.8	49,348.9	62,555.1	65,946.6	56,290.5	51,249.1	75,141.0	66,862.1	61,452.0	59,954.2	580,685.3
- Discount Portion (3)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
- Replacement/Benefit to Existing	26,713.4	40,861.3	51,335.9	53,393.5	38,786.8	27,431.6	48,564.6	34,973.1	31,009.6	27,850.7	380,920.6
- For Post 2023 Growth (4)	5,172.4	8,487.6	11,219.2	12,553.1	17,503.7	23,817.5	26,576.3	31,889.0	30,442.4	32,103.5	199,764.7

TOTAL REGION-WIDE SERVICES											
Total Net Cost (1)	200,894.6	190,675.6	218,338.3	190,953.0	239,589.8	202,956.1	205,451.7	178,664.2	198,742.8	178,803.2	2,005,069.4
Net Cost From Development Charges (2)	121,144.5	93,031.1	109,020.6	79,220.4	101,430.8	64,664.6	70,161.4	55,696.8	83,172.9	80,310.4	857,853.3
Net Cost From Non-DC Sources	79,750.1	97,644.6	109,317.7	111,732.7	138,159.0	138,291.5	135,290.4	122,967.4	115,569.9	98,492.8	1,147,216.1
- Discount Portion (3)	2,869.5	1,197.2	1,406.8	1,281.3	3,769.8	3,029.1	538.8	508.4	1,118.8	38.8	15,758.4
- Replacement	66,639.7	77,249.7	83,938.7	80,587.8	78,816.8	74,281.7	93,735.6	75,223.9	64,132.8	56,502.0	751,108.7
- For Post 2023 Growth (4)	10,240.9	19,197.6	23,972.2	29,863.6	55,572.5	60,980.8	41,016.0	47,235.2	50,318.3	41,952.0	380,349.1

Notes: (1) For total growth related capital forecast see Appendices C (Transportation) and D (Water and Wastewater).

(2) Share of capital program to be funded from development charges should calculated rates be fully implemented.

(3) Mandatory 10% reduction for applicable services.

(4) Post 2023 growth related net capital costs may be eligible for development charges in future DC by-laws, but interim financing of this share will be required.

APPENDIX G

DILLON CONSULTING LTD.

TRANSPORTATION ANALYSIS

Region of Waterloo

Transportation and Transit Study

To be incorporated into the
Region's Development Charge
Background Study

Dillon Consulting Limited

March 2014

Region of Waterloo

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1. INTRODUCTION

The Region of Waterloo (the "Region") will continue to experience rapid growth in both population and employment over the next ten years, supported by a shift to increase investment in sustainable transportation infrastructure and services. Through the application of Development Charges ("DCs"), this growth must contribute an appropriate share of infrastructure capital costs for necessary improvements in roads and traffic, transit and active transportation systems over the ten year planning period. DCs are a tool for municipalities to ensure that "growth pays for growth". The Development Charges Act ("DCA") regulates when and how municipalities may collect DCs.

The current Region of Waterloo Development Charge By-law expires in July 2014 and the Region has retained Dillon Consulting to review the transportation infrastructure component of the Region's Development Charges. This analysis will be incorporated into the Development Charge Background Study ("DC Background Study"), which Hemson Consulting will provide for use in the preparation of a new Region of Waterloo Development Charge By-law.

The purpose of this study is to provide the support documentation to the Region's Development Charge consultant (Hemson) to complete the Background Study to recover capital costs incurred by the Region for transportation (roads, traffic, transit, cycling and walking) assets to service the projected population and employment growth.

1.1. Methodology

The Development Charges Act, 1997 gives municipalities the ability to impose development charges to pay for the capital costs required because of increased need for services arising from development within the municipality. The DCA identifies what types of capital projects and services can be charged and identifies any ineligible services or exemptions. It also sets out the methodology which municipalities must use to calculate DCs.

The process which municipalities must use to calculate DCs as outlined in the DCA is as follows:

1. **Anticipate growth**: Determine the anticipated amount, type and location of population and employment growth.
2. **Identify need for services attributed to growth**: Determine the increased need for services attributed to the anticipated growth. This must not result in a level of service

exceeding the average level of service ("LOS") of that municipality over the ten year period preceding the background study ("ten year historic average LOS").

3. **Identify the capital costs for these services**: Determine the capital costs to provide the increased services, which may include: costs to acquire land; improve land; acquire, lease, construct or improve buildings, structures and facilities; costs to undertake studies; costs to undertake the DC background study; and interest on money. A deduction of ten per cent is applied to certain services as outlined in the DCA.
4. **Identify the Development Charge rules**: Develop the rules which outline when the DC is payable and amount of the charge, as well as any exceptions.

This report supports the development of items one through three above by outlining the anticipated growth, the need for services, the ten year average level of service assessment, and the capital costs for the required services. This report will inform the DC Background Study, being prepared by Hemson Consulting, which will outline the DC rules and amount of the charge, as well as any exceptions (fourth item above).

1.2. Report Structure

The report has been organized into seven chapters:

- Chapter 1 provides the introduction, methodology and report structure;
- Chapter 2 outlines the growth forecasts for the Region of Waterloo;
- Chapter 3 identifies the transportation network and the system capacity improvements planned for the Region of Waterloo;
- Chapter 4 presents the ten year transportation and transit capital programs;
- Chapter 5 reviews the road network and transit level of service to be provided within the Region;
- Chapter 6 provides a review of the methodology used to determine costs; and,
- Chapter 7 provides a summary of the recommended ten year DC eligible 2014 transportation and transit capital programs.

2. GROWTH FORECASTS

The Region of Waterloo is one of the fastest growing communities in Canada (Regional Growth Management Strategy, 2003). Historically, the Region of Waterloo has experienced significant growth and is expected to continue to grow to approximately 643,768 people by 2023, a growth of approximately 100,035 people or 18% over the 2013 population (as provided by the Region of Waterloo for the purposes of the DC Background Study). During the same timeframe, employment within the Region of Waterloo is anticipated to grow to approximately 332,450 jobs in 2023, a growth of 41,010 jobs or 14% over the 2013 employment. With this growth comes a need for increased transportation capacity, including additional infrastructure and network improvements.

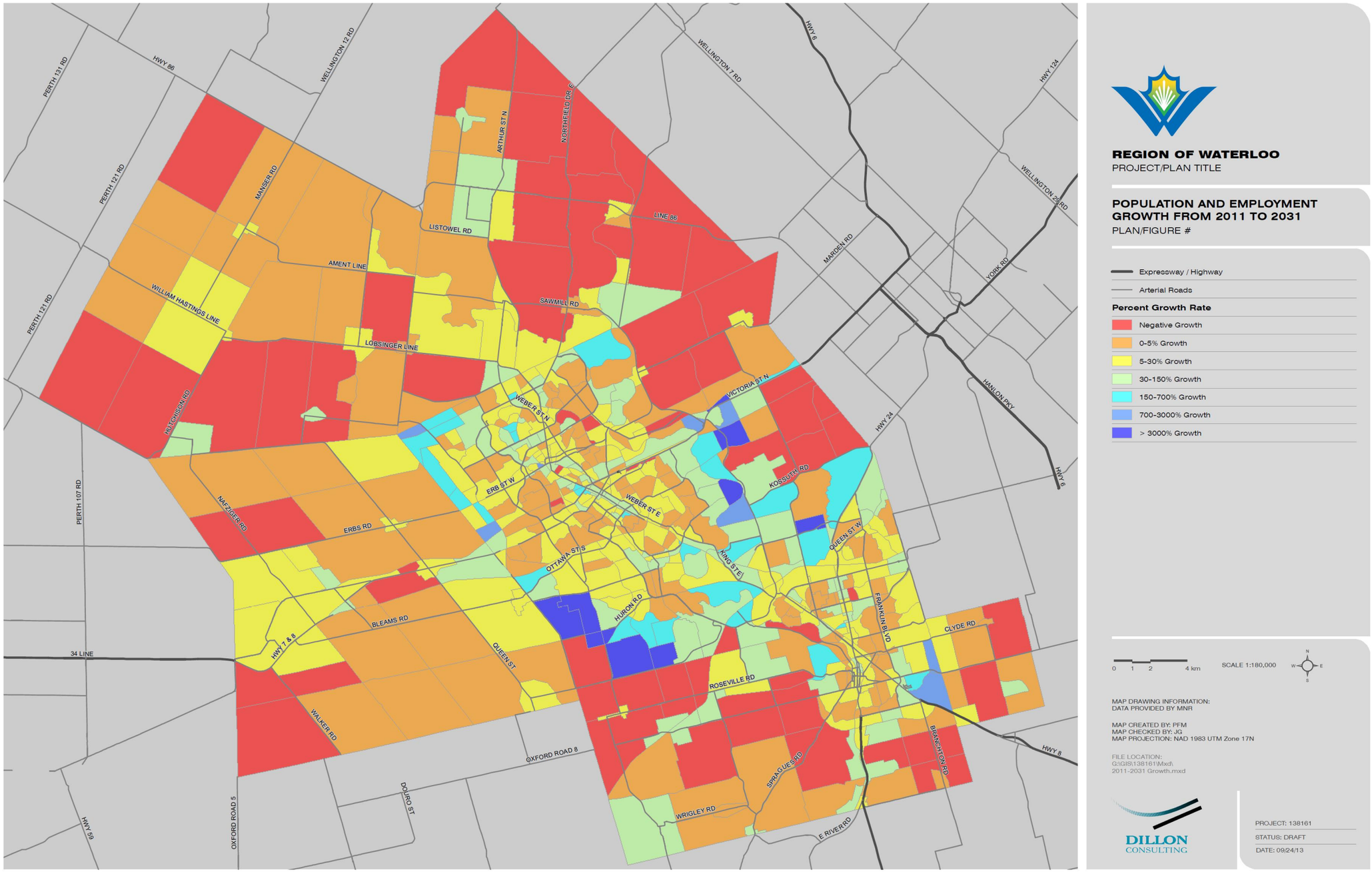
The majority of the population and employment growth is expected within the urban municipalities of Cambridge, Kitchener and Waterloo, while the rural municipalities are forecasted to experience modest growth. **Figure 2-1** presents the geographic distribution of population and employment within the Region of Waterloo as used in the 2010 Regional Transportation Master Plan.

In order to support the forecast growth in the Region, the Regional Transportation Master Plan – Moving Forward 2031 was developed in 2010 ("2010 RTMP") to determine the resultant transportation and transit infrastructure needs. The 2010 RTMP included a horizon year of 2031 and an interim horizon year of 2021, in order to recommend a future transportation and transit network that would accommodate population and employment projections. The 2010 RTMP has been used to identify the transportation infrastructure needs associated with the forecasted growth within the Region.

The population and employment assumptions within the 2010 RTMP have been compared to those used in the Regional Official Plan, 2010 ("2010 ROP") and those used in this DC Background Study to assess any variation in growth among these forecasts. A review indicates that the differences in population and employment projections in these processes are marginal and can be concluded to not have a material impact on the transportation and transit projects identified within the 2010 RTMP.

The Region has provided the population and employment projections for use in the Regional Development Charge process. For this process, the population forecasts include student population. In addition, total region-wide population and employment projections are used for the road system analysis, while total Transit Service Area population and employment are used for the transit system analysis. The Transit Service Area refers to municipalities that have transit service (i.e. Cambridge, Kitchener and Waterloo). Woolwich's transit service has not been included in the Transit Service Area.

Figure 2-1: Region of Waterloo Population and Employment Growth Distribution from the 2010 Regional Transportation Master Plan, 2011 to 2031



3. TRANSPORTATION NETWORK AND SYSTEM CAPACITY IMPROVEMENTS

Many transportation improvements identified in the Region's 2014 to 2023 DC eligible Transportation Capital Program for roads and traffic ("2014 TCP") and Transit Capital Program ("2014 Transit CP") are based on the recommendations from the 2010 RTMP, the 2012 Grand River Transit (GRT) Business Plan and the 2004 Cycling Master Plan. The 2014 TCP and the 2014 Transit CP identify all of the transportation and transit capital projects that the Region of Waterloo plans to undertake within the 2014 to 2023 time period.

3.1. Regional Transportation Master Plan, 2010

The purpose of the 2010 RTMP was to establish a multi-modal system of integrated transportation infrastructure and policies that build upon and support the approved Rapid Transit System and the land use objectives in the 2010 ROP. The 2010 RTMP recommends the infrastructure required to achieve this vision and provides a focus on new policies and practices to guide transportation decision-making for the next 20 years.

3.1.1. 2010 RTMP Vision and Goals

The 2010 RTMP has a strong focus on using sustainable transportation solutions to manage existing and future travel demand. It identifies four vision statements that support the broader policy context outlined in regional plans (Regional Transit Plan, Growth Plan and Official Plan) and provincial planning policies and plans. The vision includes:

1. Creating a Sustainable Transportation System and Policy Framework;
2. Encouraging Increased Transit Use and Promoting Transportation Choice;
3. Supporting Economic Growth; and,
4. Managing the Existing Transportation System Assets.

All recommendations adopted in the 2010 RTMP support the vision, with active transportation (walking, cycling), transit and travel demand management solutions as the primary methods to respond to growth in travel demand before increasing road lanes to accommodate auto travel. These vision statements are followed by four goals that guided the 2010 RTMP process:

1. **Optimize the Transportation System:** Make the most of what exists and avoid/defer the need for new infrastructure that does not promote other goals.
2. **Promote Transportation Choice**: Provide/maintain a transportation system that offers competitive choices for moving people and goods while minimizing single occupancy vehicle trips.
3. **Foster a Strong Economy:** Provide a transportation system that promotes retention of existing businesses and attraction of sustainable economic activity.
4. **Support Sustainable Development:** The transportation system should support sustainable growth and reduce transportation contributions to climate change.

Mode share targets were also set as a guide to help achieve the sustainable transportation goals. The focus on transit and active transportation is clearly demonstrated in these targets which also demonstrate a stronger commitment to sustainable transportation over the previous RTMP, approved by the Region in April 1999 (1999 RTMP), see **Table 3-1**. The strong transit (17.3% mode share by 2031) and active transportation emphasis has greatly decreased the extent of new roads and the widening of existing roads that would otherwise be required to address anticipated growth in travel demand.

Table 3-1: Mode Share Targets (1999 and 2010 RTMPs)

Mode	1999 RTMP		2010 RTMP	
	1996 (existing)	2016 (target)	2006 (existing)	2031 (target)
Auto (driver and passenger)	84%	77%	85.2%	70%
Transit	***5%***	***7%***	***6.5%***	***17.3%***
Pedestrian	10%	13%	7.1%	9%
Cycle	1%	2%	0.7%	3%
Other	0%	1%	0.4%	0.5%
Total	**100%**	**100%**	**100%**	**100%**

Note: 1999 RTMP based on AM Peak Hour model and 2010 RTMP based on PM Peak Hour model
Note: 2010 RTMP transit mode share includes school bus trips

3.1.2. RTMP Process

Starting with the sustainable transportation policy targets noted above, the 2010 RTMP identifies existing and projected transportation network capacity deficiencies and network improvements needed to achieve its broader goals.

The 2010 RTMP assessed 2031 traffic volumes on the regional road network using a series of 24 screenlines. A volume to capacity (v/c) ratio of 1.0 to 1.06 at the screenline and sub-area screenline level was used as a trigger to identify links that are over capacity and require some form of improvement.

This approach clearly emphasizes transit and active transportation over the private auto with a key part of the 2010 RTMP being the regional rapid transit initiative. The preferred rapid transit corridor (LRT and aBRT) recommended in the Rapid Transit Environmental Assessment – Phase 2 Summary Report, 2009 ("RT EA") as well as the preferred cycling network plan from the 2004 Cycling Master Plan formed part of the '2031 base case scenario'. Therefore, any capacity deficiencies identified in the 2031 'do nothing' scenario included the additional capacity from the approved rapid transit corridor and cycling network.

The 2010 RTMP assessment identified that 210 lane kilometres of the existing major road network (based on 2009-2010 data) in the urban municipalities are at or over capacity during the afternoon peak hour. **If the Region did nothing, this would result in 500 km of the major road network being at or over capacity by 2031.** To address these future deficiencies, a transit-oriented plan with strategic road improvements was carried forward as the basis for developing the 2010 RTMP.

The transit oriented plan is based on transit mode share targets across each screenline, which help determine the level of service and infrastructure required to achieve the target mode share. Three network alternatives were developed which included new roads and road widening projects to address remaining capacity issues that were not fully addressed by the transit improvements. The three options were evaluated based on criteria that link back to the broader goals of the 2010 RTMP. Based on the evaluation, a high frequency, low transfer transit service scenario was recommended that would help achieve the target 17.3% transit mode share by 2031. This scenario requires the highest investment in transit, but the least investment in additional road lane kilometres. One of the alternatives was then modified slightly to balance out the capital cost requirements and the phasing of the mode share improvement, which then became the preferred option.

Recommended transit improvements were further refined as part of Grand River Transit's Business Plan, 2012 ("2012 GRT Business Plan") which identified the capital requirements for

GRT over the next ten year period. Both GRT and RT transit improvements are included as part of the 2014 Transit CP.

Where transit improvements did not fully solve the capacity deficiencies, roadway improvements were recommended. Roadway improvements were structured around four main initiatives that include:

1. **Road Improvements to Support Transit and Active Transportation:** This includes transit signal priority measures, cycling lanes and sidewalks, bus queue jump and by-pass lanes and dedicated rapid transit infrastructure required to meet the screenline mode share targets and minimize the need for lane expansion projects to accommodate autos.

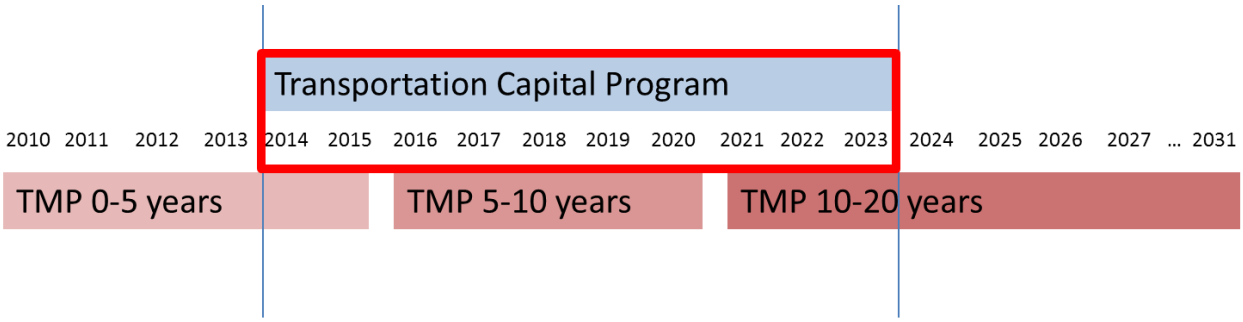
2. **Road Improvements to Support Goods Movement:** This includes road widenings or upgrades in industrial areas and improved access to the provincial highway network.

3. **Regional Road Improvements:** This includes improvements that optimize existing roads, widen existing regional roads or build new regional roads to service new development and/or address capacity requirements that cannot be fully served by enhanced transit.

4. **Provincial Highway Improvements:** This includes recommending widening of the Provincial Highway network (which is not under the jurisdiction of the Region).

The recommended 2010 RTMP capital improvements were prioritized to address capacity deficiencies, support transit, and/or support goods movement. The improvements were then categorized into three groups based on required timing: 0-5 year, 5-10 year, and 10-20 year. These recommended roadway improvements were then further refined for inclusion in the 2014 to 2023 DC eligible capital program. Based on a starting date of 2014, only certain projects of the twenty year 2010 RTMP projects were eligible for inclusion, as demonstrated in **Figure 3-1**.

Figure 3-1: Timing of the Capital Program



The 0-5 year transportation improvements not yet completed are within the timeframe for the 2014 TCP and 2014 Transit CP, as well as all of the 5-10 year improvements from the 2010 RTMP. Only the first three years of the 10-20 year transportation improvements of the 2010 RTMP fall within the 2014 TCP and 2014 Transit CP, and these projects have been selected based on anticipated need and demand. **Tables 3-2** to **3-4** below identify the roadway capital improvements that formed part of the 2010 RTMP and that are included in the 2014 TCP. **Table 3-4** identifies the 10-20 year transportation improvements included in the 2014 TCP and outlines the rationale for their inclusion.

Table 3-2: Remaining 0-5 year 2010 RTMP Roadway Improvements included in the 2014 to 2023 Capital Program

Roadway	Section	Type	Municipality	Project ID in 2014 TCP
King Street (RR8)	Eagle Street South to Shantz Hill Road	Widening	Cambridge	05337
Weber Street West (RR8)	College Street to Guelph Street	Widening	Kitchener	07101
Franklin Blvd (RR36)	Avenue Road to Hwy 401	Roundabouts & Access Management	Cambridge	05549
Fairway Road Extension (RR53)	Zeller Drive to Fountain Street	New Road	Kitchener	05274
Victoria Street North (RR55)	Bruce Street to Edna Street	Widening	Kitchener	05110
Townline Road (RR33)	Can-Amera Parkway to Avenue Road (portion from Saginaw Parkway to Avenue Road was identified through an EA)	Widening	Cambridge	05204

Table 3-3: 5-10 year RTMP Roadway Improvements included in the 2014 to 2023 Capital Program

Roadway	Section	Type	Municipality	Project ID in 2014 TCP
Ottawa Street North (RR4)	Keewatin Avenue to Forwell Road	New Road	Kitchener/ Woolwich	07130
Erb Street West (RR9)	Erbsville Court to Beechwood Drive	Widening	Waterloo	07297
Fountain Street North (RR17)	Maple Grove Road to Kossuth Road	Widening	Cambridge	07303
Northfield Drive (RR22)	Davenport Road to University Avenue East	Widening	Waterloo	07257
Homer Watson Blvd (RR28)	Conestoga College Blvd to Doon South Drive	Widening	Kitchener	07111
Franklin Blvd (RR36)	South Boundary Road to Myers Road	New Road	Cambridge	07132
River Road Extension (RR56)	Wilson Avenue to King Street East	New Road	Kitchener	07087
Bleams Road (RR 56)	Manitou Drive to Wilson Avenue	New Road	Kitchener	07134
University Avenue West (RR57)	Erb Street West to Keats Way	Widening	Waterloo	07259
Fischer-Hallman Road (RR58)	Ottawa Street South to Bleams Road	Widening	Kitchener	07121
Fischer-Hallman Road (RR58)	Bleams Road to Huron Road	Widening	Kitchener	07122
Manitou Drive (RR69)	Webster Road to Bleams Road	Widening	Kitchener	05340
Ira Needles Blvd (RR70)	Highview Drive to Erb Street West	Widening	Kitchener/ Waterloo	07282
South Boundary Road	Water Street to Franklin Blvd	New Road	Cambridge/ North Dumfries	07192

Table 3-4: 10-20 year RTMP Roadway Improvements included in the 2014 to 2023 Capital Program

Roadway	Section	Type	Municipality	Reason for Inclusion in 2014-2023 Capital Program	Project ID in 2014 TCP
Highland Road West (RR6)	Ira Needles Blvd. to Fischer-Hallman Road South	Widening	Kitchener	Plans of subdivisions are underway along Ira Needles Blvd and the Boardwalk development is in its final phases. Development is anticipated to be built and fully occupied within the ten year time horizon.	05752
Maple Grove Road (RR38)	Fountain Street North to Speedsville Road	Widening	Cambridge	Master Plans are in place for the Boxwood Subdivision, the Hunt Club development, and the Creekside lands development. Development and occupancy is anticipated within the ten year time horizon.	07116
Maple Grove Road (RR38)	Speedsville Road to Hespeler Road	Widening	Cambridge	Master Plans are in place for the Boxwood Subdivision, the Hunt Club, and Creekside lands. Development and occupancy is anticipated within the ten year time horizon. Growth creates a demand for the road to be urbanized.	07117
Bleams Road (RR56)	Fischer-Hallman Road to Strasburg Road	Widening	Kitchener	Development in the Rosenberg Secondary Plan on south-east corner of Fischer-Hallman Road and Bleams Road Development and occupancy is anticipated within the ten year time horizon.	07258
Fischer-Hallman Road (RR68)	Columbia Street West to Westmount Road North	Widening	Waterloo	Development in the University of Waterloo North West Campus is planned. Development and occupancy is anticipated within the ten year time horizon.	07221
Trussler Road (RR70)	Hwy 7/8 to Ottawa Street South	Widening	Kitchener/ Wilmot	Development of the Activa subdivision is planned. Development and occupancy is anticipated within the ten year time horizon.	05616
Trussler Road (RR70)	Ottawa Street South to Bleams Road	Widening	Kitchener/ Wilmot	Development of the Activa subdivision is planned. Development and occupancy is anticipated within the ten year time horizon.	05616
Can-Amera	Conestoga	Widening	Cambridge	Provides regional alternative to	07194

Roadway	Section	Type	Municipality	Reason for Inclusion in 2014-2023 Capital Program	Project ID in 2014 TCP
Pkwy (RR80)	Blvd to Franklin Blvd			adjacent Elgin Street and Bishop Street which are over capacity.	
New Dundee Road (RR12)	Trussler Road to Hwy 401	Upgrades	Kitchener/ North Dumfries	Portion to Fischer Hallman included as Doon South, Rosenberg and Strasburg Road extensions are planned and require upgrades to New Dundee Road.	07284
South Boundary Road	Franklin Blvd. to Dundas Street South	New Road	Cambridge/ North Dumfries	Phase 1 of this project is needed to support the South East Galt Community. Development and occupancy is anticipated within the ten year time horizon. Phase 2 timing is dependent on future development timing.	07129

Certain roadway capital improvements, which were recommended in the 2010 RTMP within the ten year timeframe, have not been included in the 2014 TCP. Exclusion of these projects was due to a range of circumstances, including actions by other jurisdictions, anticipated growth that failed to materialize as expected and lower than expected roadway demand. **Tables 3-5** lists the justification for the exclusion from the 2014 TCP of select 2010 RTMP recommended roadway capital improvements.

Table 3-5: 2010 RTMP Roadway Improvements Excluded from 2014 to 2023 Capital Program

Roadway	Section	Type	Municipality	Reason for Exclusion
Eagle Street North (RR39)	Concession Road to Industrial Road	Widening	Cambridge	Not included in the 2014-2023 Capital Program as the upcoming 2015 Rapid Transit Environmental Assessment will be studying Eagle Street.
Hwy 401	Hwy 8 to Hwy 24	Widening	Cambridge	Not included in the 2014-2023 Capital Program as the project is being implemented by the Ministry of Transportation.
University Avenue East (RR57)	Auburn Drive to Lexington Road	Widening	Waterloo	Not included in the 2014-2023 Capital Program as this was conducted as a City of Waterloo project and is now complete.

Roadway	Section	Type	Municipality	Reason for Exclusion
Hwy 7/8	Hwy 8 to Fischer-Hallman Road	Widening	Kitchener	Not included in the 2014-2023 Capital Program as the project is being implemented by the Ministry of Transportation.
Columbia Street W (RR59)	Erbsville Road to Fischer-Hallman Road North	Widening	Waterloo	Not included in the 2014-2023 Capital Program as the project being implemented by the City of Waterloo.
Fountain Street extension (RR17)	Victoria Street North to Hwy 7	New road	Woolwich	Not included in the 2014-2023 Capital Program as the project is being covered jointly with Ministry of Transportation.
University Avenue West (RR57)	Fischer-Hallman Road South to Erb Street West	Transit Priority	Waterloo	Not included in the 2014-2023 Capital Program as the project was identified as a transit priority project in the RTMP, however the widening was not needed for transit and the transit route has been planned elsewhere.
Fischer-Hallman Road (RR58)	New Dundee Road to Cedar Creek	New road	North Dumfries	Not included in the 2014-2023 Capital Program as the routing is related to Highway 401 access and the study has not been undertaken to confirm what the recommended route will be. This project is not anticipated within the 10 year timeframe of the Capital Program.
Hwy 7	Kitchener to Guelph	New road	North Dumfries	Not included in the 2014-2023 Capital Program as the project is being implemented by the Ministry of Transportation.
Block Line Road	Courtland Avenue to Lennox Lewis Way	New road	Kitchener	Not included in the 2014-2023 Capital Program as the project is being implemented by the City of Kitchener.
Columbia Street West (RR59)	Fischer-Hallman Road to Albert Street	Transit Priority	Waterloo	Not included in the 2014-2023 Capital Program as the project is being implemented by the City of Waterloo.
Strasburg Road	Huron Road to New Dundee Road	New road	Kitchener	Not included in the 2014-2023 Capital Program as the project is being implemented by the City of Kitchener.

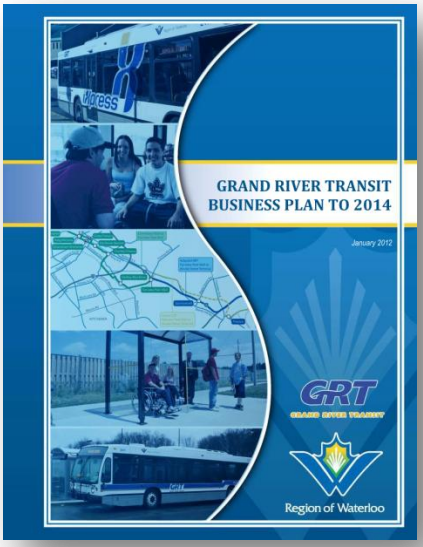
The 2014 TCP includes some roadway capital improvements that were not recommended as part of the 2010 RTMP. **Table 3-6** below lists these projects and the justification for their inclusion in the 2014 TCP.

Table 3-6: 2014 to 2023 Capital Program Roadway Improvements Not Identified in the 2010 RTMP

Roadway	Section	Type	Municipality	Reason for Inclusion	Project ID in 2014 TCP
Breslau Bypass (RR17)	Victoria Street North to Woolwich Street South	Widening	Kitchener	Included in the approved Environmental Assessment for Highway 7, which was included in the RTMP.	07131
Growth Related Land Dedication Surveys & Purchase	N/A	N/A	N/A	From time to time, the Region is required to expropriate land for the development of transportation and transit projects. When the Region expropriates land, it is their policy that they pay the land owner $1,800 to support the consultant fees for the undertaking of an R-plan survey as part of the expropriation process. This cost is included in the capital program; however it is not DC eligible.	07253
East Boundary Corridor Protection Study	N/A	N/A	N/A	The East Boundary Road Corridor was identified within the RTMP with a timing of beyond 20 years. This Protection Study is required within the 2014-2023 Capital Program to support the future efforts along this corridor.	07299
Transportation Master Plan, Growth Related Transportation Study and Transportation & Transit Forecasting Model	N/A	N/A	N/A	These various studies are required to update the TMP and support the continued implementation of regional transportation planning efforts.	07066 and 07074
Fischer-Hallman Rd (RR58)	N/A	Culvert Replacement	N/A	Identified in the Strassburg Creek Flood Control Study.	07313

3.2. Grand River Transit Business Plan to 2014

A detailed assessment of the short-term transit improvements was further developed as part of the recent GRT Business Plan. The purpose of the plan was to define the necessary transit services, infrastructure assets, technology, marketing and customer services that are required to meet the Region's goals.



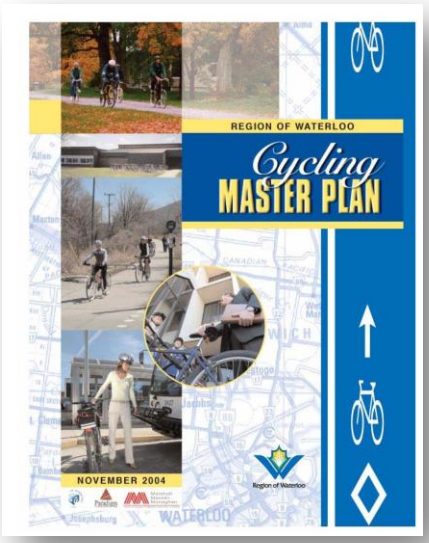
The plan was linked to the objectives of the 2010 RTMP and the Region's 2011-2014 Strategic Plan (including the goal to achieve the 2031 transit mode share target). Six goals formed the framework for the recommended strategies in the GRT Business Plan:

1. Provide a level and quality of service to accelerate transit ridership growth.
2. Improve productivity and financial performance.
3. Support and promote a sustainable, equitable and environmentally responsible community.
4. Ensure fiscal responsibility and long-term sustainable financing of transit.
5. Move towards seamless integration of GRT bus, rapid transit and interregional services.
6. Achieve a high level of employee satisfaction and workplace excellence.

The transit service strategy was based on the Express Corridor Strategy (iXpress) identified in the 2010 RTMP. An evaluation process was conducted for the implementation of the seven iXpress corridors and supporting service strategies to determine the most effective phasing to 2021. Based on the recommendations in the report, the next corridors for implementation include the University iXpress (2013) and the Victoria Highland iXpress (2015). The remaining iXpress corridors were scheduled for implementation between 2015 and 2021, with the precise dates to be determined in the next GRT Business Plan update.

The GRT Business Plan included an estimate of capital requirements, including fleet, facilities and technology. These items have been identified in the 2014 Transit CP.

3.3. Cycling Master Plan



Recommended cycling expansion projects were identified in the Region of Waterloo Cycling Master Plan (2004), which developed a core and a long term regional cycling network for a 20 year time horizon. The Region's Cycling Master Plan has a goal of doubling the mode share of cycling trips to 2% of all trips by 2016, and to identify the policies and strategies needed to implement the network.

The Region is currently undertaking an Active Transportation Master Plan that will update and supercede the 2004 Cycling Master Plan. The Active Transportation Master Plan is scheduled to be complete later in 2014, and will be included for future DC Background Studies.

The 2004 Cycling Master Plan was conducted in a three phase process as described below:

1. **Phase 1 Understanding Cycling in the Region of Waterloo**: Reviewed previous (1994) Cycling Policy Master Plan and existing trails and cycling network plans for local municipalities. Developed and executed region-wide public attitude survey (statistically valid) and analysis of cycling-related data collected as part of the Region's Transportation Tomorrow Survey (1996). Inventory of existing on and off-road cycling facilities, paths, major attractions and destinations and consideration of barriers. Held Public Information centres (PICs) and focus group sessions.
2. **Phase 2 Confirming the Network**: Confirm the vision and identify, evaluate, ground-proof and select cycling routes and suitable facilities. Investigated candidate routes through field observation and data collection. A PIC, focus group and meetings with specific interest groups were undertaken. Regional and area municipal staff were also consulted.
3. **Phase 3 Documenting the Cycling Master Plan**: Synthesized and summarized all of the work completed. Refined the network, conducted additional field checks, reviewed best practices and programs, developed benchmark unit costs and prepared cost estimates. A PIC, focus group and meetings with specific interest groups were held. Regional and area municipal staff were also consulted.

The 2004 Cycling Master Plan process considered transportation efficiency benefits, environmental benefits, health and fitness benefits, and economic benefits of cycling. As part of the process, the Region conducted various public consultation processes including public meetings, stakeholder focus groups, provided information on their website, steering committee

meetings, a public attitude survey, and transportation tomorrow survey. In order to select the preferred routes, the selection process included travel on each potential route, assessment of each route using a detailed evaluation matrix, acceptance or rejection of each potential route and determination of the appropriate cycling facility type for each accepted route.

The 2004 Cycling Master Plan recommends a core network (one to ten years) to provide an immediate trunk system to connect residents and employees with many of the significant destinations (downtown areas, malls, universities, colleges, etc.) and a long term network (11 to 20 plus years) to provide routes that improve the density of the core network and serve areas of less demand. Projects would be implemented in the 20 year time horizon (2004 to 2024). Projects are identified as either on-road routes or off-road routes for the core network and long term network. The timing of the Transportation Capital Program (2014-2023) overlaps with the second half of the 20 year time horizon of the 2004 Cycling Master Plan.

4. TEN YEAR TRANSPORTATION CAPITAL PROGRAM FOR DC APPLICATION

The 2014 TCP is comprised of the base and expansion capital projects relating to roads and traffic between the years 2014 and 2023. The 2014 Transit CP includes the base and expansion capital projects relating to transit (GRT) and rapid transit (RT) between the years 2014 and 2023. Primary sources for the identification of the various projects are the 2010 RTMP, the 2012 GRT Business Plan, the 2004 Cycling Master Plan, and the RT EA which have all been approved by Council.

The Region of Waterloo transportation model has been used (with approved population and employment growth projections as input) to forecast system travel capacity deficiencies at various screenlines resulting from the planned growth in population and employment. Targets for mode share were established and capital expansion projects were developed in transit, active transportation, roads and traffic to address the capacity deficiencies of the network.

4.1. Roads and Traffic Expansion Program

As in previous DC Background Studies, the costs for projects in the 2014 TCP which increase the capacity of the road network to accommodate growth in travel resulting from population and employment increases are charged to growth and the costs for projects to resurface, reconstruct or replace existing assets are charged to existing development. The Base Program includes projects related to road resurfacing, rehabilitation and reconstruction and the replacement of existing assets. The Expansion Program includes projects which involve adding capacity for travel by cars, trucks, buses and active transportation and acquiring the new assets required to service growth.

The approaches and methodology of the 2009 DC Background Study have been generally retained for the application of development charges to the 2014 TCP. Two differences involve the inclusion of some transit priority measures in the roads and traffic expansion program and a higher allocation of active transportation project costs to growth.

The basis for this change in approach is found in Section 5,(1),8 and 5,(5),4 of the Development Charges Act, which identifies that the ten percent capital cost reduction does not apply to services related to a **highway** as defined in subsection 1 (1) of the Municipal Act, 2001. A 'Highway' is defined in the Municipal Act as:

> *'highway' means a common and public highway and includes any bridge, trestle, viaduct or other structure forming part of the highway and, except as otherwise provided, includes a portion of a highway.*

Furthermore, a 'highway' is defined in the World English Dictionary as:

> *highway (ˈhaɪˌweɪ)*
>
> *— n*
>
> *1. a public road that **all may use***
>
> *2. chiefly (US), (Canadian) law a main road, esp. one that connects towns or cities*
>
> *3. a main route **for any form of transport***
>
> *4. a direct path or course*

The definition of a 'highway' as "a main route for any form of transportation" and "a public road that all may use" recognizes the inclusion of transit priority features, cycling and walking facilities as part of the highway. Therefore, all transit priority measures, cycling lanes and sidewalks that are constructed within the road right-of-way are DC eligible in the 2014 TCP, and the ten percent capital cost reduction does not apply. In addition, as these transit priority measures, cycling and sidewalk features are being constructed to enhance the travel capacity of the roads network, they are appropriately charged to growth.

- **Active Transportation:** The 2004 Cycling Master Plan identifies both a core and a long-term cycling network with the associated projects required for implementation. The active transportation projects identified in the 2014 TCP are on regional roads and serve a long distance corridor function connecting trip origins in growth areas with key destinations such as the universities, colleges, malls and downtown areas. These projects are required to help achieve the higher mode share targets in the 2010 RTMP for active transportation, and to manage the overall growth in travel demand.

  Cycling facilities constructed within the road right-of-way have been included in the 2014 TCP to accommodate the growth in longer trips across screenlines and to help address road congestion. Similarly, sidewalks constructed within the road right-of-way are included as road expansion projects to address the higher mode share targets for pedestrian travel across screenlines.

  All active transportation projects included in the 2014 TCP are required to complete the network, provide continuity for longer trips, and support growth areas by providing access to major destinations. Any local improvement project that serves only the existing population is not included in the 2014 TCP Expansion Program.

- **Transit Priority Measures:** Transit priority measures provide travel capacity improvements within the existing road network. Examples of transit priority measures include transit signal priority at intersections, bus queue jump and shoulder lanes, and bus curb extensions. Many municipalities include transit priority measures within the road transportation expansion capital program. Over the next ten years, there is significant travel growth projected within the Region of Waterloo and transit priority measures are required to help achieve the mode share targets, improve road travel capacity and reduce congestion. For the 2014 TCP, the Region has identified and included queue jumps, signal priority measures, enhanced stops, mini-terminals and a portion of the capital costs of an Intelligent Transportation System (ITS) which is necessary to actuate and control transit priority features. Benchmarks have been used to determine the appropriate costs for these capital projects.

The 2014 TCP comprises a Base Program and the DC Eligible Expansion Program, as summarized in **Table 4-1** below. The Base Program is funded by the Region with no costs eligible for DC's. Reviewing the projects included in the DC Eligible Expansion program and their costs has been the main focus of this DC Background Study.

Table 4-1: Summary of 10-Year Transportation Capital Program (2014 TCP)

Transportation Capital Program	Total Cost
Base Program	
Sub-Total Base Program	**$358,968,000**
DC Eligible Expansion Program	
Intersection Improvements (Growth Related)	$81,345,000
Growth Related Turn Lanes	$14,790,000
New Traffic Signal Installations	$7,825,000
Road Widenings	$256,159,000
New Road Links and Studies	$124,268,000
New Cycling Lanes	$21,200,000
Regional Sidewalks Constructed with Road Works	$17,885,000
Sidewalks Constructed as Separate Projects	$2,210,000
Sub-Total DC Eligible Expansion Program	**$525,682,000**

4.2. Transit Expansion Program

The major elements of the 2014 Transit CP are the additional vehicles required to service growth and the associated facilities required to maintain, service and store these vehicles. In previous DC studies, the transit expansion program referred to Grand River Transit buses and facilities, while this study also includes the LRT and aBRT vehicles, tracks and facilities, starting in 2017. The LRT and aBRT services have been included in the 2014 Transit CP as they are a key component of the regional transit network and are being implemented to provide transportation network capacity. The 2014 Transit CP is presented in **Table 4-2**.

Table 4-2: Summary of 10-Year Transit Capital Program (2014 GRT CP)

2014 Transit Capital Program	Total Cost
GRT Capital Program	$ 237,224,000*
Rapid Transit Capital Program	$ 785,495,000**

*This amount includes GRT expansion and base costs, estimated at $130.8 million and $107.9 million respectively and does not include the transit priority measures, as these have been included in the Transportation Capital Program.

**Total RT project budget including Federal and Provincial cost sharing. Region's share of RT Capital is expected to be $253 million.

5. LEVEL OF SERVICE ANALYSIS

The assessment of level of service is an important component in this development charges study. The level of service analysis, as outlined by the DCA, considers the impact of the proposed transportation improvements to determine if the planned improvements included in the 2014 TCP will improve, maintain or reduce the overall system service level compared to the service level that has been experienced over the previous ten years (historic ten year average). The level of service is measured on the basis of both quantity and quality factors. The following sections provide the level of service analysis for the road network and the transit service.

5.1. Level of Service for Road Network

The calculation of system level of service was completed to understand whether the extent of roadway improvements that are included in the 2014 TCP will improve or worsen the overall level of service on the roadway network, given the population and employment growth forecast to occur in the Region.

In order to calculate level of service for the road network, quantity and quality measures are considered. In keeping with the 2009 Development Charge Background Study, two methods have been used to establishing the historic service level for transportation. The first method identifies the service level as a dollar per population and employment based on the valuation of the inventory of capital assets. The DC Background Study, prepared by Hemson Consulting has identified this historic level of service based on capital assets. The second method analyses the historic and forecasted traffic flows in the Region to consider historic and future level of service of the Transportation network. The quantity measure being used in this method is the lane kilometres per 1,000 population and employment, as it is a factor that considers the overall capacity of the road network to provide for the population and employment. The quality measure being used is vehicle kilometres travelled per lane kilometre, as it is a factor which considers the congestion and user experience on the road network. These are the same factors that have been used in previous development charges studies by the Region of Waterloo.

5.1.1. Lane Km per 1,000 Population and Employment (Quantity Measure)

This measure is calculated by dividing the urban area population and employment into the lane kilometres for the regional road network. This provides a quantity measure of the level of service, namely the number of lane kilometres per resident and employee in the Region.

To calculate this measure over the last ten years, population and employment data was provided by the Region for the period 2004 to 2013. Roadway data was obtained from the

Region of Waterloo Road Inventory Management System (RIMS) database for the years 2004 to 2013. The database includes road section lengths and number of lanes.

Table 5-1 presents the number of lane kilometres per 1,000 population and employment over the last ten year period. As illustrated, the number of lane kilometre per 1,000 population and employment has progressively decreased between 2004 and 2013[1]. The 2004 to 2013 ten year average is 2.43 lane kilometres per population and employment.

The previous ten year average lane kilometres per population and employment were compared to the ten year horizon (2023) to identify any changes in the proposed level of service. The 2023 calculation was based on approved population and employment estimates for this time period and the lane kilometres added to the network from projects that are identified in the 2014 TCP.

As identified in **Table 5-1**, the 2023 lane kilometres per population and employment (1.79) is approximately 17.3 percent lower than the previous ten year average of 2.17. This means that the level of service quantity factor is expected to decline over the next ten years.

[1] The lane kilometres for the regional road network were not available for the years 2004 and 2013. To complete the assessment, a trend analysis was conducted for these years based on actual RIMS data from 2005 and 2012.

Table 5-1: Historical and Projected Lane Kilometres per 1,000 Population and Employment (Regional Road Network)

Year	Lane Kilometres	Population and Employment*	Lane KMs per 1,000 Pop and Emp	% Change from Previous Year
2004	1,661	726,416	2.27	
2005	1,673	741,290	2.26	-0.5%
2006	1,682	756,391	2.21	-2.3%
2007	1,684	768,031	2.20	-0.5%
2008	1,681	777,941	2.16	-1.6%
2009	1,685	773,414	2.18	0.9%
2010	1,697	789,599	2.15	-1.2%
2011	1,698	807,945	2.10	-2.4%
2012	1,710	824,933	2.07	-1.4%
2013	1,710	835,173	2.06	-0.5%
10 Year Average	***1,688***	**780,113**	**2.17**	
2023	***1,747.5***	**976,218**	***1.79***	**-17.3%**

*Uses Region-wide population and employment.

5.1.2. Vehicle Trip Kilometres per Lane Kilometre (Quality Measure)

This level of service quality measure is calculated by dividing the 24-hour traffic volumes by the lane kilometres for the regional road network within the Region of Waterloo. This method of calculating overall roadway LOS quality was used in the 2009 Development Charges Study and is considered a valid and acceptable methodology.

The previous ten year service level was updated from the 2009 Development Charges Study by obtaining both traffic count and roadway characteristic data from the Region of Waterloo Road Inventory Management System database for the years 2004 to 2013. The database includes the Average Annual Daily Traffic (AADT) volumes over the length of the road section, calculated using mid-block volumes from the traffic database, road section lengths and number of lanes.

The Region's AADT's are derived using both midblock 24-hour counts and intersection turning movement counts. The Region counts approximately 300 intersections and 100 mid-block

locations each year, which can be used to estimate/interpolate downstream and upstream volumes which the Region considers to represent AADT volumes on regional roads.

Starting in 2010 the Region began using only a 24-hour factor to convert a turning movement count to a 24-hour count. This change in methodology resulted in a different AADT count volume than in previous years. To ensure consistency in the historical trend analysis, this new methodology was applied to previous years to determine vehicle kilometres between 2004 and 2013.[2]

Table 5-2 presents the average daily vehicle kilometres per lane kilometre over the last ten year period. As illustrated, the average daily traffic per lane kilometre has increased between 2004 and 2013.

An increase in this measure means that traffic (number of vehicle kilometres) is growing at a faster rate than the capacity of the network (lane kilometres) and suggests that the quality of service is reduced. The 2013 number of daily vehicle kilometres per lane kilometre (4,203) is approximately twelve percent higher than the ten year average of 3,712.

[2] The historical level of service for the regional road network volume and lane kilometres was not available for the year 2004 and 2013. To complete the analysis, a trend analysis was conducted for these years based on actual RIMS data from 2005 and 2012.

Table 5-2: Historical Network Level of Service (Regional Road Network)

Year	Lane Kilometres	Daily Vehicle Kilometres	Daily Vehicle Km / Lane km	% Change from Previous Year
2004	1,661	5,350,081[2]	3,221[2]	
2005	1,673	5,641,136	3,372	4.7%
2006	1,682	5,674,062	3,401	0.9%
2007	1,684	5,652,354	3,352	-1.4%
2008	1,681	6,478,274	3,854	15.0%
2009	1,685	6,463,161	3,835	-0.5%
2010	1,697	6,528,386	3,840	0.1%
2011	1,698	6,783,620	3,994	4.0%
2012	1,710	6,926,576	4,051	1.4%
2013	1,710	7,187,130[2]	4,203[2]	3.8%
10 Year Average	***1,688***	**6,268,446**	***3,712***	**-11.7%**

The ten year average level of service was then compared to the projected level of service for the 2021 and 2031 road network. Since the regional transportation model uses PM Peak Hour volumes, the future projected volume with the recommended road network was converted to a 24-hour daily volume to enable comparison with the previous ten year period as measured by the RIMS database and provincial traffic count data. A peak hour to 24-hour conversion factor of 10.57% was used based on information available from the 2011 TTS data. AADT data and roadway characteristics for the provincial highway network were obtained from the Ministry of Transportation Traffic Office to also validate the volume on the provincial highway network within the Region of Waterloo.

A further adjustment to the forecasting model was made to account for 5.2 percent truck traffic on regional roads. This percentage was based on data obtained from traffic data. For provincial highways, truck percentages reported by MTO vary by highway and highway section, from 5.2 percent on a section of Highway 85 to 30 percent on a section of Highway 401. The average truck traffic for the entire provincial highway network in the Region of Waterloo was 14 percent.

The observed 24-hour vehicle kilometres per lane kilometre data was calculated using RIMS and provincial highway count data and was compared with the forecasted 24-hour vehicle kilometres per lane kilometre from the regional transportation model for the year 2011 to validate the forecasted trip volumes (see **Table 5-3**). This was completed separately for the regional road network and the provincial highway network.

Table 5-3: Validation of Existing Transportation System Level of Service

Analysis Scenario	24-Hour Vehicle Kilometres Per Lane Kilometre	
	Regional Roads	Provincial Highways
Observed 2011 RIMS Database	3,994	12,343
Regional Transportation Model Assigned 2011 Volume on Existing Network	3,682	12.428
Percent Difference (2011 Observed versus Assigned)	-7.8%	0.7%

For the regional road network, the difference between the observed and model assigned data indicates an under-simulation of approximately 7.8 percent. For the provincial highway network, the difference between the observed and model assigned data indicates an over-simulation of approximately 0.7 percent. Both are considered a reasonable correlation between the observed and model assigned volumes and therefore provide the validation required to use the regional transportation model to assess the future transportation system level of service for comparison with the ten year historic average.

To determine whether the roadway improvements identified in the 2014 ten year capital plan would improve the roadway level of service quality, the average level of service for the previous ten years was compared with the assigned 2021 and 2031 level of service from the regional transportation model (with the recommended roadway improvements as identified in the 2010 RTMP in place). Since 2023 is the horizon year for the 2014 TCP, the 2021 quality results provide a closer proxy to the level of service forecasted for this study.

Table 5-4 below illustrates the forecasted change in this quality measure for 2021 and 2031[3] compared to the previous ten year average and the Regional Transportation Model Assigned 2011 volume on the existing network.

[3] Note: The Regional Transportation Model is based on the 2021 and 2031 horizon years and therefore used instead of the 2023 horizon year identified in the 2014 TCP. While the 2021 horizon provides a very close proximity to 2023, the 2031 horizon was also assessed to verify the outcome.

Table 5-4: Year 2021 Transportation System Level of Service

Analysis Scenario	24-Hour Vehicle Kilometers Per Lane Kilometre	
	Regional Roads	Provincial Highways
Previous 10 Year Average Volume on the Road Network	3,712	12,007
Regional Transportation Model Assigned 2011 Volume on Existing Road Network	3,682	12,428
Regional Transportation Model Assigned 2021 Volume on Existing Road Network	4,244	14,053
Regional Transportation Model Assigned 2021 Volume on 2021 Road Network	**4,018**	**13,575**
Regional Transportation Model Assigned 2031 Volume on 2031 Road Network	3,863	14,469

Based on this analysis, the 2021 level of service quality for both the regional road network and the provincial highway network will be worse than both the 2011 level of service as well as the observed average level of service for the previous ten years. This represents an 8% reduction in the vehicle kilometres per lane kilometre compared to the previous 10 year average for the regional road network.

To confirm this conclusion, the RTMP 2031 horizon year was also compared and included all the recommended roadway improvements in the 2014 TCP. As illustrated, the level of service on the Provincial Highway Network continues to worsen between 2021 and 2031. On the regional road network, the level of service improves slightly between 2021 and 2031 due to an increase in transit investment and thus higher transit mode share. However, the 2031 level of service is still worse than the 2011 level of service as well as the previous 10-year average level of service.

There are several reasons for this decrease in level of service quality for the road network that has occurred and is projected to continue over the next ten years. The first is a change in development patterns throughout the Region. As the Region continues to grow, there is a stronger emphasis on development within the urban area where there is less opportunity to expand the road network to accommodate additional roadway demand. Many roads are already built out to the full width of the right-of-way with little opportunity to expand. This higher demand

for roadway use in areas with constrained ability to expand within the right of way results in more vehicle kilometres per lane km.

The second and more important reason is a change in philosophy and the priority being placed on roadway expansion. With every update to the Region's Transportation Master Plan comes a stronger emphasis on developing a sustainable and multi-modal transportation system which increases choice and takes emphasis away from single occupant travel in the private automobile. The 2021 conditions include a rapid transit corridor and increases in supporting bus services. This is expected to result in an increase in transit mode share and a reduction in road expansions to accommodate private cars. It is also a primary factory for the projected improvement in regional roadway level of service between 2021 and 2031.

In addition, the trigger to increase lane capacity has increased from a v/c ratio of 0.9 in the 1999 RTMP to a trigger of 1.0 to 1.06 in the 2010 RTMP. This means that the Region is willing to accept a higher level of congestion before widening a road or adding lane capacity. This is considered good planning as the Region continues to focus on more sustainable modes to accommodate increased travel demand from population and employment growth.

The overall result of this analysis is that the level of service for the road network as measured by both quality and quantity factors is expected to get worse in the 2014 to 2023 year period compared to the previous ten years.

5.2. Level of Service for Transit

Grand River Transit (GRT) is responsible for the provision of transit bus services including iXpress routes. Commencing in 2017, an LRT/aBRT service will be introduced in the central corridor which will be operated by an external contractor. The transit system currently operates a fleet of 247 conventional buses and three BusPLUS vehicles (Bus PLUS is a service operated for new neighbourhoods where there is no existing transit). At the end of 2013, the total fleet had a replacement value of approximately $117.5 million. 'Other' capital assets required for transit services are the garages, buildings, storage areas and terminals with a total of 391,761 square feet and other items such as service vehicles, fare boxes, etc. These 'other' capital assets have a replacement value of approximately $96.2 million and are acquired in proportion to the number of vehicles in the fleet.

5.2.1. Transit Level of Servicing - Ten Year Funding History (Investment Cap)

Previous Development Charge studies have used a calculation for the ten year average level of transit service (quality and quantity) as represented by a replacement value amount per population and employment. This is calculated by identifying the ten year historic transit service

inventory replacement value (including buses and transit facilities) per population and employment for each year from 2004 to 2013 and is illustrated in **Table 5-5**.

The above calculations indicate a ten year average service level for transit of $238.29 per population and employment. Based on this value and the 2014 to 2023 growth forecast of an increase of 122,963 in population and employment, the previous ten year average service level generates a DC eligible amount of $26.4 million (after the legislative reduction is applied) for transit growth-related capital works during the period 2014 to 2023.

The overall result of this analysis is that the transit level of service investment cap for 2014 to 2023 DC eligible transit capital projects in the 2014 Transit CP is $26.4 million.

Table 5-5: Transit Historical Ten Year Funding Envelope (Investment Cap) Calculation, Hemson

REGION OF WATERLOO
INVENTORY OF CAPITAL ASSETS
TRANSIT

BUILDINGS	# of Square Feet										UNIT COST
	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	($/sq. ft.)
Administration / Maintenance / Bus Storage											
250 Strasburg Road, Kitchener	156,240	156,240	198,241	198,241	198,241	198,241	198,241	198,241	198,241	198,241	$126
460 Conestoga Blvd., Cambridge	49,514	49,514	49,514	69,162	69,162	69,162	69,162	69,162	69,162	69,162	$126
85 Chandler Drive										96,728	$265
Passenger Terminals											
15 Charles Street West, Kitchener	21,143	21,143	21,143	21,143	21,143	21,143	21,143	21,143	21,143	21,143	$282
35 Ainslie Street, Cambridge	6,487	6,487	6,487	6,487	6,487	6,487	6,487	6,487	6,487	6,487	$282
Total (sq.ft.)	**233,384**	**233,384**	**275,385**	**295,033**	**295,033**	**295,033**	**295,033**	**295,033**	**295,033**	**391,761**	
Total ($000)	**$33,780.0**	**$33,780.0**	**$39,085.7**	**$41,567.8**	**$41,567.8**	**$41,567.8**	**$41,567.8**	**$41,567.8**	**$41,567.8**	**$67,200.7**	

LAND	# of Hectares										UNIT COST
	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	($/ha)
Administration / Maintenance / Bus Storage											
250 Strasburg Road, Kitchener	3.89	3.89	3.89	3.89	3.89	3.89	3.89	3.89	3.89	3.89	$740,000
460 Conestoga Blvd., Cambridge	1.27	1.27	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	$740,000
85 Chandler Drive										2.15	$740,000
Passenger Terminals											
15 Charles Street West, Kitchener	1.21	1.21	1.21	1.21	1.21	1.21	1.21	1.21	1.21	1.21	$990,000
35 Ainslie Street, Cambridge	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	$740,000
Total (ha)	**7.23**	**7.23**	**7.63**	**7.63**	**7.63**	**7.63**	**7.63**	**7.63**	**7.63**	**9.77**	
Total ($000)	**$5,650.3**	**$5,650.3**	**$5,949.8**	**$5,949.8**	**$5,949.8**	**$5,949.8**	**$5,949.8**	**$5,949.8**	**$5,949.8**	**$7,532.3**	

VEHICLES	# of Vehicles										UNIT COST
	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	($/vehicle)
Conventional Buses											
Low Floor	125	141	155	170	176	189	198	213	225	235	$463,700
High Floor	54	50	46	38	36	23	14	11			$463,700
Hybrids					6	6	6	12	12	12	$708,118
MobilityPlus Buses[1]	25	26	28	30	32	32	32	34	34	34	$0
Total (#)	**204**	**217**	**229**	**238**	**250**	**250**	**250**	**270**	**271**	**281**	
Total ($000)	**$83,002.3**	**$88,566.7**	**$93,203.7**	**$96,449.6**	**$102,553.1**	**$102,553.1**	**$102,553.1**	**$112,366.2**	**$112,829.9**	**$117,466.9**	

1. Currently being replaced on a 6 year cycle and thus not eligible for DC funding.

REGION OF WATERLOO
INVENTORY OF CAPITAL ASSETS
TRANSIT

STOPS AND SHELTERS	# of Shelters										UNIT COST
	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	($/shelter)
Regular stops	314	314	314	314	314	314	314	332	348	358	$12,350
Regular stops (no shelters but landing pads with curb)	828	872	917	966	1,017	1,070	1,139	1,196	1,243	1253	$2,375
iXpress shelters		10	16	16	17	17	17	53	53	92	$27,300
Timed Transit Nodes	7	7	7	7	7	7	7	7	8	8	$545,600
Total (#)	**1,149**	**1,203**	**1,254**	**1,303**	**1,355**	**1,408**	**1,477**	**1,588**	**1,652**	**1,711**	
Total ($000)	**$9,663.5**	**$10,040.0**	**$10,312.7**	**$10,427.4**	**$10,575.4**	**$10,702.5**	**$10,866.3**	**$12,206.8**	**$13,061.6**	**$14,273.6**	

SYSTEMS, EQUIPMENT & STUDIES	# of Systems & Equipment										UNIT COST
	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	($)
Systems & Software											
Scheduling system		1	1	1	1	1	1	1	1	1	$800,000
Signal Priority software		1	1	1	1	1	1	1	1	1	$87,000
INIT Technologies (iXpress technology package)				1	1	1	1	1	1	1	$1,803,000
Video surveillance system									1	1	$231,000
Bus Lock System									1	1	$100,500
Equipment											
Garage Hoists (in ground)	14	16	16	18	18	18	18	18	18	26	$137,000
Portable Garage Hoists	1	1	1	3	3	3	3	3	3	2	$52,000
Transit Garage Scissor Lift (FM at OPS)	1	1	1	1	1	1	1	1	1	1	$45,000
Bus Wash	2	2	2	2	2	2	2	2	2	2	$78,000
Brake Lathe	2	2	2	2	2	2	2	2	2	1	$45,000
Tire Installer	1	1	1	1	1	1	1	1	1	1	$11,000
Tire Balancer	1	1	1	1	1	1	1	1	1	1	$8,000
Vault Receivers	3	3	3	3	3	3	3	3	3	3	$27,000
Studies											
Transportation Master Plan (transit component)	$63,819	$69,114	$52,027	$128,297	$541,000	$326,000	$140,500	$158,000	$87,500		
Central Transit Corridor Study	$5,504										
Road Improvement Transit Priority Strategy									$50,000		
Active Transportation Master Plan								$100,000	$257,000		
Transit Network Review						$50,000					
Commuter Parking Lot Feasibility Study									$75,000		
Transportation and Transit Forecast Model (transit portion)								$50,000	$125,000		
Road Improvement Transit Priority Strategy										$150,000	
Total (#)	**25**	**29**	**29**	**34**	**34**	**34**	**34**	**34**	**36**	**42**	
Total ($000)	**$2,430.3**	**$3,591.1**	**$3,574.0**	**$5,831.3**	**$6,244.0**	**$6,079.0**	**$5,843.5**	**$6,011.0**	**$6,629.0**	**$7,183.5**	

REGION OF WATERLOO
CALCULATION OF SERVICE LEVELS
TRANSIT

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	
Historic Population (Transit Service Area)	426,396	434,790	442,447	448,420	454,520	457,890	461,532	470,570	475,993	480,527	
Historic Employment (Transit Service Area)	224,395	229,031	234,318	237,720	239,415	230,872	240,349	247,019	255,883	259,832	
Total Population & Employment (Transit Service Area)	**650,791**	**663,821**	**676,765**	**686,140**	**693,935**	**688,761**	**701,881**	**717,588**	**731,876**	**740,359**	**= (F)**

INVENTORY SUMMARY ($000)

Buildings	$33,780.0	$33,780.0	$39,085.7	$41,567.8	$41,567.8	$41,567.8	$41,567.8	$41,567.8	$41,567.8	$67,200.7	
Land	$5,650.3	$5,650.3	$5,949.8	$5,949.8	$5,949.8	$5,949.8	$5,949.8	$5,949.8	$5,949.8	$7,532.3	
Vehicles	$83,002.3	$88,566.7	$93,203.7	$96,449.6	$102,553.1	$102,553.1	$102,553.1	$112,366.2	$112,829.9	$117,466.9	
Shelters	$9,663.5	$10,040.0	$10,312.7	$10,427.4	$10,575.4	$10,702.5	$10,866.3	$12,206.8	$13,061.6	$14,273.6	
Systems & Equipment	$2,430.3	$3,591.1	$3,574.0	$5,831.3	$6,244.0	$6,079.0	$5,843.5	$6,011.0	$6,629.0	$7,183.5	
Total ($000)	**$134,526.4**	**$141,628.1**	**$152,126.0**	**$160,225.8**	**$166,890.1**	**$166,852.1**	**$166,780.5**	**$178,101.6**	**$180,038.1**	**$213,657.0**	**= (D)**

SERVICE LEVEL ($/pop & emp)											**10 Year Average Service Level**
Buildings	$51.91	$50.89	$57.75	$60.58	$59.90	$60.35	$59.22	$57.93	$56.80	$90.77	$60.61
Land	$8.68	$8.51	$8.79	$8.67	$8.57	$8.64	$8.48	$8.29	$8.13	$10.17	$8.69
Vehicles	$127.54	$133.42	$137.72	$140.57	$147.78	$148.89	$146.11	$156.59	$154.17	$158.66	$145.15
Shelters	$14.85	$15.12	$15.24	$15.20	$15.24	$15.54	$15.48	$17.01	$17.85	$19.28	$16.08
Systems & Equipment	$3.73	$5.41	$5.28	$8.50	$9.00	$8.83	$8.33	$8.38	$9.06	$9.70	$7.62
Total ($/pop & emp)	**$206.71**	**$213.35**	**$224.78**	**$233.52**	**$240.50**	**$242.25**	**$237.62**	**$248.19**	**$246.00**	**$288.59**	**$238.15**
											= (A)

REGION OF WATERLOO
CALCULATION OF MAXIMUM ALLOWABLE FUNDING ENVELOPE
TRANSIT

10-Year Funding Envelope Calculation		
10 Year Average Service Level 2004 - 2013	$238.15	(A)
Net Population & Employment Growth 2014 - 2023	122,963	(B)
Maximum Allowable Funding Envelope	$29,283,531	(C) = (A) x (B)
Less: Uncommitted Excess Capacity	$0	(H)
Less: 10% Legislated Reduction	$2,928,353	(I) = ((C) - (H)) * 10%
Discounted Maximum Allowable Funding Envelope	**$26,355,178**	(J) = (C) - (H) - (I)

Excess Capacity Calculation ($000)

2013 Inventory	$ 213,657.0	(D)
Using Average Service Level	$ 176,316.6	(E) = (A) * (F) / 1000
Committed Excess Capacity	$ 2,552.6	(G) (see Appendix E)
Additional Committed Excess Capacity	$ 34,787.8	(H) = greater of (D) - (E) - (G) or '0'

6. SYSTEM COSTS

The Region of Waterloo has undertaken a cost analysis of each project included in the 2014 TCP for the roads and traffic projects (Appendix C of Hemson's Background Study). These cost analyses were based on detailed or preliminary designs that were available from environmental studies or more advanced project developments (detailed designs). Where a detailed or preliminary cost estimate was not available, the Region applied construction benchmark cost estimates to establish the project cost.

Construction benchmark cost estimates are composed of typical unit costs for construction components, used to estimate project costs. This process is described below.

6.1. Construction Benchmark Unit Prices

The Region's construction benchmark unit prices were prepared and updated to 2014 costs based on unit prices from recent (within the past two years) road tenders for a variety of contracts within the Region of Waterloo. **Table 6-1** provides these 2014 benchmark unit prices. These benchmarks were used to cost new road construction and widening projects in the 2014 TCP.

Table 6-1: 2014 Benchmark Unit Costs

Item	Unit Price	Unit
Plane Existing Asphalt	$7.00	m^2
Hot Mix (Hot Laid) - HL1 (50mm) – Super Pave 12.5	$88.00	tonne
Hot Mix (Hot Laid) - HL4 (90mm) – Super Pave 19	$70.00	tonne
Glasgrid	$10.00	m^2
Granular 'A' Road Base	$15.50	tonne
Granular 'B' Road Subbase	$13.50	tonne
Curb and Gutter	$45.00-48.00	m
Excavation	$12.40	m^3
Concrete Boulevard Edging	$40.00	m
Storm Sewer Lead Extensions	$200.00	m
Catchbasin Relocations	$2,230.00	each

Item	Unit Price	Unit
Clearing/ Grubbing/ Miscellaneous Removals	$25.00	m
General Cut / Fill for Rough Grading	$100.00	m
Storm Sewer Placement	$440.00	m
Lateral Storm Sewers Placement	$200.00	m
Storm Manholes	$5,000	each
Landscaping	$50.00	m
Topsoil & Seeding	$6.00	m^2
Ditching	$12.40	m

6.2. Benchmark Unit Price Review

The benchmark unit prices were reviewed against a number of bid evaluation forms from 2014 bid documents and also compared with experience in other municipalities. This review concluded that the 2014 benchmark unit prices are reasonable for use in the 2014 TCP.

For the 2014 Transit CP, with the cap methodology generating such a small percentage of the transit expansion cost, a detailed review of transit project costs was not required as part of the DC Background Study.

6.3. Application of Benchmark Unit Prices

The benchmark unit prices are applied to a variety of road improvement types to determine the estimated construction costs. The different road improvement types are:

- New construction - urban road;
- New construction - rural road;
- Existing 2 lane road reconstruction cost when road widening;
- Widening of an existing 2 lane road to 4 lanes - including total road reconstruction;
- Widening of an existing 2 lane road to 4 lanes - with no existing road reconstruction;
- Widening of an existing 4 lane road to 6 lanes - including total road reconstruction; and,
- Widening of an existing 4 lane road to 6 lanes - with no existing road reconstruction.

In addition to the cost generated by the unit prices for the road improvements, there are a number of allowances that have been included in the costing for each improvement type. These

allowances were determined using the following assumptions for new road construction projects:

- One bridge structure per ten km of new roads ($1,500,000 / 10 km);
- One km of noise wall per ten km of new roads ($80,000 / km);
- Two intersecting side streets per km which includes:
    - Road connection ($40,000 / km)
    - Turn lanes ($100,000 / km)
    - Utility relocation ($50,000 / km)
    - Traffic signals ($170,000 / km)
- One intersecting regional road per two km
    - Road connection ($50,000 / km)
    - Turn lanes ($50,000 / km)
    - Utility relocation ($50,000 / km)
    - Traffic signals ($170,000 / km)
- One roundabout every ten km ($180,000 / km)
- Illumination
    - Street lights costs at intersections and roundabouts ($50,000/km)
    - Street lights costs on one side of the road ($42,200 / km)
    - Street lights costs on two sides of the road ($84,400 / km)
- General items that are not common to all projects represent 18% of base construction benchmark costs and may include storm water outlets, line painting/detour, sodded areas/erosion control blankets, guiderails/fences, construction layout, soil and materials testing, subdrains, dewatering excavations, subexcavation of poor soil, retaining walls and bike lanes. This cost is added to the total generated by the unit items.
- Engineering functions as a percentage of costs is 30% (this includes functional design, detailed design, contract administration, the Region's administration and contingency).

Similarly, for road widening projects the following assumptions were made:

- One km of noise wall per ten km of road widening ($80,000 / km)
- Two intersecting side streets per km which includes:
    - Road connection ($40,000 / km)
    - Turn lanes ($100,000 / km)
    - Utility relocation ($50,000 / km)
    - Traffic signals ($170,000 / km)

- One intersecting regional road per two km
    - Road connection ($50,000 / km)
    - Turn lanes ($50,000 / km)
    - Utility relocation ($50,000 / km)
    - Traffic signals ($42,500 / km)
- One roundabout on regional road every ten km ($180,000 / km)
- Driveway and sidewalk replacement
    - Twenty driveways per km ($40,000 / km)
    - Sidewalk replacement ($150,000 / km)
    - Utility relocation ($50,000 / km)
- General items that are not common to all projects represent 18% of base construction benchmark costs and may include storm water outlets, line painting/detour, sodded areas/erosion control blankets, guiderails/fences, construction layout, soil and materials testing, subdrains, dewatering excavations, subexcavation of poor soil, retaining walls and bike lanes. This cost is added to the total generated by the unit items.
- Engineering functions as a percentage of costs is 30% (this includes functional design, detailed design, contract administration, the Region's administration and contingency).

Costs associated with the relocation of existing illumination are included within the allowance for utility relocations in the benchmark costs. Structure improvement costs related to widenings is reviewed by the Region as part of the capital plan preparation and included as a separate line item within the 2014 TCP.

Tables 6-2 and 6-3 provide the construction benchmark unit costs that have been used for each road improvement type when more project specific information is not available in the form of a preliminary or detailed design cost estimates.

Table 6-2: Benchmark Unit Costs by Facility Improvement Type (New Construction)

Facility Improvement Type	Unit Price / metre
1 - Lane Urban Road	$3,603 m
2 - Lane Urban Road	$3,959 m
3 - Lane Urban Road	$4,315 m
4 - Lane Urban Road	$4,735 m
5 - Lane Urban Road	$5,090 m
6 - Lane Urban Road	$5,446 m
7 - Lane Urban Road	$5,802 m
2 – Lane Urban Road on 4 – Lane Base	$4,397 m
2 – Lane Rural Road on 2 – Lane Base	$2,820 m
4 – Lane Rural Road on 4 – Lane Base	$3,454 m

Table 6-3: Benchmark Unit Costs by Facility Improvement Type (Widenings)

Facility Improvement Type	Unit Price / metre
Road Widening (2 to 4 Lanes) With No Existing Road Reconstruction.	$2,958 m
Road Widening (2 to 4 Lanes) With Full Existing Road Reconstruction.	$4,225 m
Road Widening (2 to 4 Lanes) With no Existing Road Reconstruction but including storm sewers.	$3,824 m
Road Widening (4 to 6 Lanes) With No Existing Road Reconstruction.	$3,165 m
Road Widening (4 to 6 Lanes) With Full Existing Road Reconstruction.	$4,939 m
Road Widening (4 to 6 Lanes) With no Existing Road Reconstruction but including storm sewers.	$4,074 m

7. SUMMARY OF DC ELIGIBLE 10 YEAR TRANSPORTATION CAPITAL PROGRAM

The results of this Transportation and Transit Study are to be incorporated in the Development Charge Background Study, which Hemson Consulting is completing for use in the preparation of a new Region of Waterloo Development Charge By-law. **Table 7-1** presents a summary of the 2014 to 2023 Recommended Transportation Capital Program for roads and traffic as well as the portion to be incorporated in the Regional Development Charges. For transit, the investment cap will result in $26.4 million of transit capital costs being eligible for inclusion in Development Charges. Please see the DC Background Study for further details on the proposed rates and Appendix C of that report for the apportionment between Growth Share and Benefit to Existing.

Table 7-1: Region of Waterloo 2014 Expansion TCP - Development Related Capital Forecast

Expansion Program Project Categories	Benefit to Existing	Growth Share	Total
Intersection Improvements (Growth Related)	$15,450,000	$65,896,000	$81,345,000
Growth Related Turn Lanes	$448,000	$14,343,000	$14,790,000
New Traffic Signal Installations	$0	$7,825,000	$7,825,000
Road Widenings	$7,651,000	$248,508,000	$256,159,000
New Road Links and Studies	$65,000	$124,203,000	$124,268,000
New Cycling Lanes	$0	$21,200,000	$21,200,000
Regional Sidewalks Constructed with Road Works	$0	$17,885,000	$17,885,000
Sidewalks Constructed as Separate Projects	$0	$2,210,000	$2,210,000
Total DC Eligible Transportation Infrastructure	**$23,613,000**	**$502,069,000**	**$525,682,000**

Source: Hemson Consulting