



**TOWN OF NIAGARA-ON-THE-LAKE**

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**2010  
WATER SYSTEM FINANCIAL PLAN**

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**SEPTEMBER 2, 2010**

**\*Revised September 14, 2010**



**DFA Infrastructure International Inc.**

## Executive Summary

This report addresses the Town of Niagara-on-the-Lake's (the Town) need to identify the full costs associated with its water systems and establish an appropriate method of cost recovery. The report deals with a review of the regulatory and legal requirements, the existing water systems, identification of the existing costs and revenues, an estimate of future costs, identification of opportunities for full cost recovery and recommendations with regard to implementing a preferred financing strategy. The main conclusions and recommendations are:

### ES-1 Water

#### Conclusions

Based on the information contained in this report, the following are our main conclusions with respect to water system financing:

1. The Town of Niagara-on-the-Lake's water system is comprised of approximately 189.7 kilometres of watermain with a value estimated at \$132,784,400. PVC forms most (64%) of the Town's pipe network. The remaining pipes are mainly asbestos cement (27%) and cast iron (6%).
2. A significant portion (64%) of the overall system is less than thirty (30) years old. Almost all the PVC pipe falls into this age group. On the other hand, most of the cast iron pipe is approximately seventy-five (75) years old or of unknown age. The asbestos cement (AC) pipe is generally over fifty-five (55) years old. This suggests that there is a major need for replacement of the cast iron pipe and AC pipe.
3. The actual cost of managing the Town's water system in 2010 is anticipated to be \$4,204,073 (gross) and \$3,991,273 (net). A significant portion (54%) is related to water treatment and supply, 26% for O&M and 20% for capital contributions to reserve. A small percentage (0.27%) is related to debt charges.
4. Approximately 16.8% of water supplied to the Town is unaccounted for and considered to be "non-revenue generating" volumes. This may be due to a combination of items including but not limited to system flushing, fire fighting, system losses, street washing etc. However an audit needs to be undertaken by the Town to identify the reasons for this relatively high percentage and possible steps towards reducing the "non-revenue generating" volumes.
5. The full cost of managing the Town's water system over the next twenty-five (25) years based on *net* costs is estimated to be \$8,085,443 annually or \$2.87 per cubic metre. It is important to note that the 2011 annual cost is not required to be \$8,085,443. This is the annual amount that would be required if the total cost over the twenty-five (25) year period is levelized into twenty-five (25) equal annual amounts. Approximately 53% of these costs are for the Region's charge, followed by 18% for O&M, 14% for pipe replacement, 11% for contributions to the Capital Reserve Fund and 4% for debt repayment.

6. Options 1 and 2 are projected to provide for the necessary full cost recovery over the next twenty-five (25) years. The projected fixed monthly charge and uniform rate under Option 1 & 2 are shown in Table 8-1. Option 2 appears to provide more sustainable financing over the next four (4) years, and also addresses the current multi-residential issue regarding the fixed monthly charge per unit.

**Table ES-1 – Alternative Water Rates for 2011**

<b>Water Rate Alternatives</b>	<b>Fixed Monthly Charge (\$/Month)</b>	<b>Uniform Consumption Rate (\$/m3)</b>
<i>Option 1</i> <i>Fixed Monthly Charge - Per Unit &amp; Uniform Consumption Rate</i>	\$20.03	\$1.2249
<i>Option 2</i> <i>Fixed Monthly Charge (Based on Meter Size) &amp; Uniform Consumption Charge</i>	<ul style="list-style-type: none"> <li>• 5/8" - \$20.03</li> <li>• 3/4" - \$20.03</li> <li>• 1" - \$28.05</li> <li>• 1-1/2" - \$36.06</li> <li>• 2" - \$58.10</li> <li>• 3" - \$220.37</li> <li>• 4" - \$280.48</li> <li>• 6" - \$420.71</li> <li>• 8" - \$580.99</li> <li>• 10" - \$801.36</li> </ul>	\$1.2249 ( same as Option 1)

7. Implementation of the Region’s new rate structure of 50% fixed and 50% variable in 2011 (based on the assumptions noted and a phased-in approach) would require the following:
- An increase of 26% in 2011, 18% in 2012, 12% in 2013, 10% in 2014, and 6% in 2015 to the Town’s fixed monthly charge based on meter size (Option 2); and
  - A reduction of approximately 6% to the uniform consumption rate in 2011, followed by increases of 10% in 2012, 10% in 2013, 7% in 2014, and 6% in 2015.

Approximately 42% of the Town’s revenue in 2012 would be generated by the monthly fixed charge and 58% from the uniform consumption rate. This would change to 48% fixed and 52% variable by 2020 and then to 50% fixed and 50% variable by 2022.

The capital reserve balance is projected to be approximately \$950,000 to \$975,000 by 2012, then \$500,000 to \$837,000 by 2018, then \$800,000 to \$1,300,000 from 2019 to 2026, then between \$600,000 and \$900,000 from 2027 to 2034, with a decline to \$100,000 for two (2) years during this period.

## Recommendations

The following are our main recommendations with respect to water system financing:

1. Update the current water rates to facilitate recovery of the full costs associated with management of the water system over the next twenty-five (25) years;
2. Use the Net Full Cost as the basis for updating the water rate as the net cost considers revenues that would normally be expected as part of the business operations;
3. Consider the establishment of a rate stabilization reserve fund to address annual fluctuations in consumption and related cost and revenue variations. This reserve should be maintained at approximately 10% of the Region's total charge to the Town (i.e. fixed and consumption charges);
4. The rates and charges noted in Option 2 should be considered for implementation by the Town beginning in 2011;
5. If the Region decides to change its rate structure to 50% fixed and 50% variable in 2011, then the Town should consider the projections shown in Section 8.4 and discuss these with the Region prior to setting its new rates and charges;
6. The Town's current debt repayment schedule indicates annual repayment costs of approximately \$600,000 to \$700,000 for a ten (10) year period. This is anticipated to result in higher water rates than would otherwise be required if the debt were to be repaid over a longer period. Therefore, consideration should be given to repayment of debt over a longer period than currently planned; and
7. The volume of water purchased by the Town as noted in the 2009 record of Water Requisition from the Region, when compared to the volume billed to customers, indicates an apparent significant unaccounted for water volume of approximately 16.8%; an audit should be conducted to determine the reasons for this difference, with a view to reducing the unaccounted for water volumes (i.e. Increasing the revenue generating volumes).

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# 1 Introduction

## 1.1 Background

The Town of Niagara-on-the-Lake (the Town) owns and operates the water distribution systems that service the residents and businesses in Niagara-on-the-Lake and is therefore responsible for the costs and financing associated with managing this system. In Niagara, the Regional Municipality of Niagara (the Region) is responsible for the water treatment and transmission. The Area Municipalities purchase treated drinking water from the Region and are responsible for the water distribution services to their respective customers.

Niagara-on-the-Lake obtains its water from the Decew Water Treatment Plant and the Niagara Falls Water Treatment Plant which are owned and operated by the Region. The Town distributes the drinking water through the 2 respective distribution systems that are supplied by these two (2) Regional water treatment plants. Bevan Heights is supplied from the Niagara Falls Water Treatment Plant. For the purposes of this report, the Town of Niagara-on-the-Lake and Bevan Heights Water Distribution Systems are considered as one. The Region's charges to the Town for these services include a fixed charge established by the Region plus an amount based on actual consumption multiplied by a unit rate per cubic metre. In simple terms, the Region is the "wholesaler" and the Town is the "retailer" of water services in Niagara-on-the-Lake. The Region's charges are more fully explained in Section 5.1. Therefore, the Region's charges are a major part of the Town's annual service delivery costs. Prior to 2009, the Region charged Area Municipalities for water based on consumption only. As of 2009, the Region changed its rate structure to include a 25% fixed charge and 75% variable charge per cubic metre based on consumption. The Region is currently considering changing its rate structure to a 50% fixed charge and a 50% variable charge.

The total cost of the Town's water services, including payments made to the Region, are recovered from daily operating revenues (e.g. administrative fees, etc.) and through direct billing to customers. In 2005, the Town prepared a financial plan which included a review of alternative water rate structures and established its own customer charges based on a fixed monthly fee plus a uniform rate per cubic metre for volume of water consumed. These fees are intended to cover the full life cycle costs of the water system including annual operating and capital costs. However, there is a need for the Town to update its rates based on the current rate structure to reflect changes to the Region's rate structure, and to provide a financial plan to meet the requirements of the Drinking Water Quality Management System as defined under O.Reg. 453/07.

In addition, the multi-residential unit customers have expressed a concern that the current monthly fixed charge per unit results in undue high charges given that the size of the service connections is similar to that of single family homes. This matter is also addressed in this report.

## 1.2 Purpose

The purpose of this financial plan is to:

- Identify the full costs of managing the Town's drinking water service to customers based on the most recent information;
- Update the Town's current rates and charges to its customers, based on the current structure of a fixed monthly charge and uniform consumption rate per cubic metre, to recover the full costs of supplying and distributing drinking water to customers;

- Address the issue of the multi-residential fixed charges; and
- Present a financial plan in accordance with the requirements of the Sustainable Water and Wastewater Systems Act and the licensing of the water system, as defined in O.Reg. 453/07.

## 2 Regulatory Requirements

### 2.1 Provincial Regulations

Provincial requirements governing water services primarily include the following:

- The Environmental Assessment (EA) Act;
- The Environmental Protection (EP) Act;
- The Safe Drinking Water Act (O.Reg. 170/03);
- The Municipal Act;
- The Sustainable Water and Wastewater Systems Act, 2002; and
- The Development Charges Act.

The first three (3) set out the technical requirements related to service delivery. The EA Act applies to expansion of existing facilities and establishment of new capacity such as the installation of new pipes. The EA Act establishes the minimum requirements for the operations of water systems in terms of the potential environmental impacts.

The Safe Drinking Water Act, 2002 (SDWA) has significant implications to the daily operations as it sets out the water sampling and other requirements (in O.Reg. 170/03) for ensuring that the water delivered to consumers is high quality and safe for consumption. This Act has been a major influence over the past several years in terms of adjustments to operational practices and quality expectations to both the Region and the Town. In addition, there is also a requirement under this Act (O.Reg 188/07) for drinking water providers to establish a Drinking Water Quality Management System (DWQMS) and obtain a licence for their respective water systems. As part of this DWQMS, and as required under O. Reg. 453/07 (Financial Plans Regulation), operating authorities must submit a financial plan for their respective systems.

There are also many regulations and guidelines that deal with design and operation standards that mandate certain activities be undertaken as part of service delivery.

The Municipal Act and the Sustainable Water and Wastewater Systems Act, 2002 also set out the financial requirements for managing the water systems including the assessment and recovery of full costs. The Municipal Act, Part VII, Section 293 requires municipalities to establish reserves for dealing with long-term liabilities. This applies directly to the pipe networks and the future liabilities associated with their age and condition. The Municipal Act also permits the Town to establish fees for cost recovery and requires public input prior to any fee adjustments. The Development Charges Act and regulations establishes the requirements for the recovery of portions of future growth related capital expenditures to be incurred by the Town.



### *The Sustainable Water and Wastewater Systems Act, 2002*

One of the main recommendations contained in Justice O'Connor's report on the Walkerton incident is the need for municipalities to identify the full cost of Water services and to develop a sustainable plan to finance these costs. This resulted in the establishment of the Sustainable Water and Wastewater Systems Act, 2002 in December 2002 which now requires operators of Water systems to report full costs and the method of cost recovery to the Province of Ontario. The Regulations under this Act are pending.

Under the Sustainable Water and Wastewater Systems Act, 2002, the Town would be required to submit to the Province of Ontario:

- A report prepared by a Professional Engineer, identifying the full cost of water services;
- A report identifying a sustainable method by which the Town would recover these costs;
- The comments made by the Town's Auditor following a review of both report; and
- Copies of Council resolutions accepting the recommendation of reports;

Apart from being a best business practice as recognized by the Town's staff and Council, the preparation of this full cost assessment and recovery report is mandated by the Sustainable Water and Wastewater Systems Act, 2002.

## **2.2 DWQMS Requirements**

Regulation 188/07 under the Safe Drinking Water Act requires Ontario municipalities to apply for and obtain Drinking Water System Licences as part of their overall DWQMS. One of the requirements to obtain a drinking water licence is to prepare and submit a financial plan in accordance with O.Reg. 453/07. A copy of the Town's financial plan is due to be submitted to the Ministry of the Environment by October 15, 2010.

In general, the financial plan must apply to a period of at least six (6) years and must include the following:

- The proposed or projected financial position of the drinking water system;
- The proposed or projected financial operations of the drinking water system; and
- The proposed or projected gross cash receipts and gross cash payments.

These requirements are addressed in Section 6 and Appendix F.

## **2.3 Town of Niagara-on-the-Lake By-laws**

By-Law 4381-10 provides for the establishment of water rates and charges in the Town of Niagara-on-the-Lake and identifies the various 2010 water rates for the different situations (i.e. regular customers, multiple occupancy customers, bulk water stations, irrigation rates) that exist within the Town. These rates are updated annually and implemented through the annual update of By-Law 4381-10. A copy of this by-law is included in Appendix A.

The Town also has a by-law governing the Development Charges for growth related projects based on the 2008 Development Charges Study prepared in accordance with the Development Charges Act. This establishes the amounts to be recovered by the Town from developers.

### 3 Methodology

This financial plan consists of two (2) main parts. Part I identifies the full costs (or investment plan) associated with managing the water system over a twenty-five (25) year period from 2010 to 2034. Part II identifies the recovery of costs (or revenue plan) through proposed rates and charges to customers.

#### *Part I – Full Cost Methodology*

Calculation of the Town’s full cost of managing the water system is based on estimating and projecting the annual costs related to the primary activities required to deliver drinking water to customers. These include:

- Annual operations and maintenance (O&M) costs including allowances for operational adjustments;
- Regional charges for treatment and supply of drinking water to the Town;
- Watermain replacement costs over the twenty-five (25) year period based on life expectancy and age;
- Capital funding required for growth related projects over and above funding available through the Development Charges Reserve Fund and direct contributions by developers;
- Allowances for studies and non-growth operational improvement projects;
- Annual contributions to a capital reserve fund for financing capital projects;
- Annual contributions to a rate stabilization reserve fund to offset major peaks and valleys in rate requirements due to annual fluctuations in demand as a result of unpredictable weather patterns; and
- Repayment of existing and proposed future debt.

The assumptions made with respect to these cost items are presented in Section 5.4. The annual costs are calculated in 2010 dollars over the period. Using Net Present Value (NPV) calculations, the full cost of managing the water system per cubic metre of water is determined.

#### *Part II – Full Cost Recovery Methodology*

The Town’s current rate structure, which includes a fixed monthly charge plus a uniform consumption rate per cubic metre, is maintained as the basis for calculating the rates and charges required to generate sufficient revenues to recover the projected costs identified in Part I. The Town’s 2010 fixed monthly charge and uniform consumption rate are used as the starting point from which the rates and charges in future years are projected based on annual increases. Two (2) options are determined as follows:

- Option 1: Fixed Monthly Charge per Unit plus a Uniform Consumption Rate. This is the current approach used by the Town to recover its costs.
- Option 2: Fixed Monthly Charge per Customer based on Meter Size plus a Uniform Consumption Rate. This represents a change in the application of the monthly fixed charge. Under this option, customers would pay a monthly charge that is based on the size of their respective service lines and meters as opposed to the current charge which applies to the number of units serviced.

In addition to the two (2) options, a projection of the required fixed charge and uniform consumption rate for the Town is presented in Section 8.4, should the Region migrate to 50% fixed charge/ 50% consumption rate

structure and establish its own rate stabilization reserve. The assumptions made are also provided in this section.

Data Sources

The primary sources of data used to prepare this financial plan are listed in Table 3-1. In addition, information was also developed from discussions with and input from the Town’s staff, as required.

**Table 3-1 - Financial Plan Data Sources**

<b>Item</b>	<b>Data Source</b>
Watermain Life Expectancy	<ul style="list-style-type: none"> <li>• PSAB</li> </ul>
Watermain Replacement Costs	<ul style="list-style-type: none"> <li>• Town’s recent Tender Prices</li> <li>• Recent bids in Niagara</li> </ul>
Asset Value (2010)	<ul style="list-style-type: none"> <li>• PSAB</li> </ul>
Growth	<ul style="list-style-type: none"> <li>• D.C. Study (2008) for new assets</li> <li>• Town’s Planning Department for user growth</li> </ul>
Compliance/System Improvements Requirements	<ul style="list-style-type: none"> <li>• Town Public Works Staff</li> </ul>
O & M Costs	<ul style="list-style-type: none"> <li>• Town’s 2010 Budget</li> </ul>
Water Purchase from Region	<ul style="list-style-type: none"> <li>• Region’s Historical Consumption Records</li> <li>• 2009/10 Regional Charges to Town</li> </ul>
Water System Revenues	<ul style="list-style-type: none"> <li>• Town’s Records for 2009/10</li> </ul>
Debt	<ul style="list-style-type: none"> <li>• Town’s 2010 records</li> </ul>

## **4 The Existing Water System**

Water services are generally delivered by the Town’s operations staff with support from external contractors and consultants for capital projects.

The Town provides water directly to its customers primarily through its water distribution system which is connected to the Region’s water supply system. In addition to the direct service connections to properties, the Town also provides bulk water stations for private water haulers and irrigation services to farmers as required via temporary hydrant connections. In all cases, water use is metered.

The Town also conducted sampling of water delivered to customers via lead service pipes, in accordance with the standard sampling protocol outlined in Schedule 15.1 of O.Reg. 170/03. Based on the results obtained, the

Ministry of the Environment (MOE) advised in a letter dated January 15, 2010 that the sampling requirements were met and the Town is no longer required to conduct plumbing sampling under the community lead testing program. However, the Town is required to test for lead under the “reduced sampling requirements” from December 2011 to April 2012 and again from June 2012 to October 2012 and the MOE may direct the Town to resume the standard sampling if there are changes in the water chemistry that could increase lead levels. The sampling undertaken suggests that replacement of the service connections is not required.

## 4.1 Consumption

The historical volume of water purchased (consumed) by the Town from the Region for distribution to customers as well as information regarding population growth (units or number of accounts) are shown in Appendix B. The three (3) year annual average volume of water purchased from the Region based on the Region’s meter records (from October 2006 to September 2009) is 2,948,375m<sup>3</sup>. However, this amount is considered to be an overestimate of the future annual volumes projected to be purchased by the Town due to the closure of a major industry in within the Town in 2008 and the resulting drop in demand. In addition, based on the volume of water purchased by the Town in the last two (2) years, consumption is reasonably consistent. Therefore, for the purposes of this report, the Town’s annual volume to be purchased from the Region is projected to be constant at 2,770,577 m<sup>3</sup>, based on the two (2) year average which more closely reflects current consumption, plus any future growth.

Based on 2009 data provided by the Town, customers were billed for approximately 2,304,011 m<sup>3</sup>, which is approximately 16.8% less than the actual volume projected to be purchased from the Region (based on the 2-year average of actual consumption). This difference represents the “unaccounted for” water which appears to be unusually high compared to a similar comparison in 2002 which indicated unaccounted for water at 10%. Further investigation is required by the Town to determine the reasons for the unaccounted volume.

The Town’s Growth Management Study indicates that historically, water accounts grew on average by 2.08% per year from 2002 to 2010. The Town’s future growth is expected to be influenced by the Recent Green Belt legislation. Based on current growth projections from the Town’s Planning Department, it is estimated that growth beyond 2010 over the twenty-five (25) year period covered by this report would be as follows:

- 2011 – 1%;
- 2012 to 2016 – 2.38% per year;
- 2017 to 2021 – 2.05% per year;
- 2022 to 2026 – 1.77% per year; and
- 2027 to 2034 – 1.51% per year.

The annual water demand projections over the twenty-five (25) year period include increases in consumption to allow for future growth. These annual allowances for increased consumption are believed to be reasonable as they are consistent with current consumption volumes per customer. This translates to a projected increase in the annual consumption volume of 2,770,577 m<sup>3</sup> in 2010 to 2,812,412 m<sup>3</sup> by 2034.

## 4.2 Water System Infrastructure

The water distribution systems consist of approximately 189.7 kilometres of watermain of varying age and material. These include cast iron, asbestos cement, polyethylene (PE) and polyvinyl chloride (PVC) pipes. In

addition, there are approximately 500 hydrants, 700 main valves, 6500 service lines and 6,500 water meters. The service area population for the two (2) distribution systems is approximately 13,000 people.

Based on 2009 data, PVC comprises the majority (63.84%) of the Town’s pipe network. The remaining pipes are mainly cast iron (6.29%), asbestos cement (27.15%), and PE (2.52%). Based on replacement costs of \$675 per metre, the value of the existing water system is estimated to be approximately \$132,784,400 (in 2010 dollars).

Table 4-1: Water System by Age and Material identifies the life expectancy of the pipes and the length of pipes by material comprising the system. Appendix C contains a table showing the quantity of the various types of pipes installed between 1885 and 2010 in five (5) year intervals. This information is used to calculate the approximate age of various pipes as of 2010 and the need for replacement within the next twenty-five (25) years based on life expectancy.

A significant portion (64%) of the overall system is less than thirty (30) years old. Almost all the PVC pipe falls into this age group. Conversely, most of the cast iron pipe is over seventy-five (75) years old, which is well beyond their life expectancy of sixty (60) years. The asbestos cement (AC) pipe is generally over fifty-five (55) years old with a life expectancy of sixty (60) years.

This suggests that there is a major need for replacement of the cast iron and asbestos cement pipe during the twenty-five (25) year period. It is projected that approximately 46.7 km or 25% of the watermain network is due to be replaced over the twenty-five (25) year period at an estimated cost of \$21,212,227 (NPV 2010).

**Table 4-1 Water System by Age & Material (Based on December 2009 data)**

Pipe Material	Expected Life (years)	Length of pipe (metres)	Installation Year Range	% of System by Material	Total Watermain to be Replaced in 25 Year Period (m)	% of Watermain to be Replaced over 25yrs
PVC	80	121,092.90	1962 - 2009	63.84%	0.00	0.00%
CI	60	11,922.62	1891 - 1978	6.29%	11,922.62	6.29%
AC	60	51,497.17	1891 - 1985	27.15%	34,801.41	18.35%
PE	80	4,779.30	1999 - 2007	2.52%	0.00	0.00%
COPP	80	400.29	2001 - 2009	0.21%	0.00	0.00%
Unknown	75	0.00	N/A	0.00%	0.00	0.00%
<b>Total Length (m)</b>		<b>189,692.28</b>		<b>100.00%</b>	<b>46,724.03</b>	<b>25%</b>

## **PART I – Full Cost Assessment**

This part of the report identifies the current and future costs associated with the management of the Town’s water system to project the full costs over the next twenty-five (25) years (2010 to 2034). The program revenues associated with the system are also identified.

Program revenues are defined as those revenues that are routinely generated each year by the daily operations and include administrative revenues such as valve turning service fees. It is important to note that these program revenues do not include the revenues generated by the water rates (i.e. from the sale of water).

There are also future revenues from the recovery of development charges as established under the Town’s Development Charges By-Law that mandates the recovery of portions of growth related capital expenditures.

Accordingly, the calculation of full costs is based on the “Net” Full Costs. This is based on considering the program revenues, development charges and financing from the “special area levy” reserve all of which offset a portion of the gross costs. These revenues are expected to be generated as part of the daily management of the water systems. Therefore, the Net Full Costs are used to calculate the amounts to be recovered to fully finance the water systems.

Cost recovery is addressed in Part II – Full Cost Recovery.

## **5 Full Cost Assessment**

### **5.1 Current Water System Costs and Program Revenues**

This section identifies the annual costs to deliver drinking water to customers. These are based on the Town’s approved 2010 budget as listed in Appendix D and categorized by activity as shown in Table 5-1: Existing (2010 Budget) Water System Costs. The total gross cost is estimated to be \$4,204,073 for 2010 with program revenues of approximately \$212,800. The net cost (after program revenues are considered) is estimated to be \$3,991,273. These costs include:

- *Operations and maintenance (O&M) costs of the water distribution systems.* This includes the costs of administration, pipe repairs and maintenance, water meter maintenance and replacement, hydrant maintenance and replacement, water service installations and maintenance, the operation of the bulk water stations, and irrigation. The annual O&M net cost (daily operating after revenues) of the distribution systems is \$1,064,280 and represents approximately 27 % of the total water system annual costs;
- *Regional charges for the supply of treated water to the Town.* Beginning in 2009, the cost of water treatment and supply as billed by the Region is based on fixed charge and variable charges. The fixed charge represents the Town’s proportionate share (based on the 3-year average volume consumed compared to other municipalities) of 25% of the Region’s annual cost. The variable rate is based on 75% of the Region’s cost and the total variable cost to the Town is calculated as the product of the actual (metered) water purchased by the Town multiplied by the Regional uniform water rate. Note that the Region is currently reviewing this matter, and is considering changing its rate structure in 2011 to a 50% Fixed Charge and 50% Variable rate. However, no decision has been made as to how this rate structure change might unfold. Section 8.4 of this report provides a projection of how such a change would



impact the Town's water rates and charges based on the assumptions noted. The treatment cost is estimated to be approximately \$2,141,000 or 54% of the overall net cost.

- *Contributions to the capital reserve fund that is used to finance a portion of the capital projects.* The contribution to the capital reserve is \$785,993 or 20% of the overall cost for 2010. Capital expenditures are incurred primarily to replace and install existing water pipes each year. The costs associated with studies, design and construction are included in the capital expenditures. The capital costs associated with growth are normally recovered through developer contributions and financing from the Development Charges Reserve established by the Town. The 2010 opening balance in the Capital Reserve Fund was \$115,000, with \$700,000 being owed to the Consolidated Sanitary Sewer Reserve Fund.
- *Debt repayment.* The Town currently has debt from 2 different sources (internal and external) that is being used to finance a portion of their capital projects. These include:
  - Debenture financing of a recently completed project for \$1,800,000; and
  - Internal borrowing of \$700,000 from the Consolidated Sanitary Sewer Reserve Fund.

In 2010, the debt payment represents 0.3% of the annual operating costs, but over the next ten (10) years, this is scheduled to increase as the Town intends to finance most of its capital program over the next five (5) years through debentures. This is required until such time as the rate supported Waterworks Improvement Reserve is replenished and has sufficient funds available to begin financing capital projects again.

The cost of operations and maintenance and the treatment costs are recovered from four (4) primary sources:

- The sale of water to consumers based on a monthly fixed charge plus the metered volume times the water rate;
- Program revenues generated from specific services offered to consumers as part of the daily operations and maintenance activities;
- Developer contributions and Development Charges; and
- Grants (usually through Federal and Provincial Funding Programs).

The program revenues result from the daily O&M activities and reduce the annual O&M costs, as shown in Table 5-1. However, they are insufficient to cover the total costs incurred by the Town. The shortfall in revenues is recovered through the annual water rates and the sale of water.

The program revenues are approximately \$212,800 in 2010. As a result, the net O&M cost is \$1,064,280, which represents approximately 27 % of the overall net cost of \$3,991,273. The 2010 O&M costs are generally reflective of the increased water sampling and analysis program, as required under O.Reg. 170/03 and activities related to the DWQMS requirements.

**Table 5-1 – Niagara-on-the-Lake 2010 Budget for Water Supply, Statement of Operations, Water System – Existing (2010) Gross & Net Costs**

Description	2010 Projected Gross Costs Budget	%	2010 Projected Revenues (\$)	2010 Projected Net Costs (\$)	%
<b>O&amp;M - Water Distribution</b>					
Departmental Administration	\$602,550.00		\$139,800.00	\$462,750.00	
Training	\$26,000.00		\$0.00	\$26,000.00	
Water Sampling & Testing	\$62,500.00		\$0.00	\$62,500.00	
Valves	\$26,000.00		\$0.00	\$26,000.00	
Repair & Replace Mains	\$82,500.00		\$0.00	\$82,500.00	
Repair & Replace Services	\$79,000.00		\$1,000.00	\$78,000.00	
Watermain Cleaning	\$27,500.00		\$0.00	\$27,500.00	
Meter Readings	\$62,500.00		\$0.00	\$62,500.00	
Meter Repairs	\$85,000.00		\$1,000.00	\$84,000.00	
Service Installations (new)	\$25,000.00		\$25,000.00	\$0.00	
Meter Installations	\$27,000.00		\$35,000.00	-\$8,000.00	
Utilities Stakeout	\$33,500.00		\$0.00	\$33,500.00	
Hydrants	\$74,000.00		\$9,000.00	\$65,000.00	
Irrigation From Hydrants	\$7,500.00		\$2,000.00	\$5,500.00	
Bulk Water Station	\$10,750.00		\$0.00	\$10,750.00	
Compliance	\$32,500.00		\$0.00	\$32,500.00	
Inventory	\$2,500.00		\$0.00	\$2,500.00	
<b>Total O&amp;M Water Distribution</b>	<b>\$1,266,300.00</b>	<b>30.12%</b>	<b>\$212,800.00</b>	<b>\$1,053,500.00</b>	<b>26.40%</b>
<b>Water Treatment ( Regional Fixed &amp; Uniform) Costs</b>	<b>\$2,141,000.00</b>	<b>50.93%</b>	<b>\$0.00</b>	<b>\$2,141,000.00</b>	<b>53.64%</b>
<b>Contribution to Reserve (Capital)</b>	<b>\$785,993.00</b>	<b>18.70%</b>	<b>\$0.00</b>	<b>\$785,993.00</b>	<b>19.69%</b>
<b>Debt Charges - Water</b>	<b>\$10,780.00</b>	<b>0.26%</b>	<b>\$0.00</b>	<b>\$10,780.00</b>	<b>0.27%</b>
<b>Total</b>	<b>\$4,204,073.00</b>	<b>100%</b>	<b>\$212,800.00</b>	<b>\$3,991,273.00</b>	<b>100%</b>

Notes –

1. The Town's internal debt of \$700,000 is to be repaid to the Wastewater Revenue fund over a ten (10) year period at \$70,000 annually, at 0% interest beginning in 2013.
2. The Town is also has debt of \$1.8M for Capital Projects undertaken in 2009 which is to be repaid with interest over ten (10) years, starting in 2010.
3. The Town proposes to undertake Capital Projects for the years 2010 to 2014. These projects would be partly funded by Debentures totaling approximately \$2,341,945. This is subject to final decision by the Town as to whether or not these projects should be alternatively funded through the Capital Reserve Fund.

## 5.2 Full Cost Considerations

The full cost of managing the Town's water system should take into account all factors that have a bearing on the level of effort required to ensure a safe and reliable supply of potable water to the consumer over the long-term. These include both current and future considerations that would influence the cost of managing the system throughout its lifetime, which can be several decades for water systems. Examples include replacement and rehabilitation of the pipe network. The cost implications of some of these factors are more predictable and therefore more readily estimated than those of other factors (e.g. the Town's O&M costs are more predictable than the Region's consumption charges).

Higher costs are expected in the future as the water business environment changes. However, the impact can be mitigated by fully understanding, assessing and planning for future water system costs. The following sections



identify the main drivers of cost, the assumptions made in quantifying costs, and an estimate of the full cost of managing the water system. The period used for this assessment is twenty-five (25) years (2010 to 2034).

### 5.3 Cost Components and Factors Influencing Water System Costs

There are several factors that would influence the cost to the Town of managing the water system and need for capital expenditures. These factors are described in Table 5-2. The extent to which they could affect costs varies depending on the business environment of the day. However, there are certain future impacts that can be reasonably anticipated at this time.

**Table 5-2 - Cost Components and Factors Influencing Water System Costs**

Factor	Description	Cost Implications
<b>Water systems operations and maintenance (O&amp;M)</b>	This is the annual cost of operating and maintaining the current system including administrative costs.	This is a direct annual cost that is reasonably consistent from year to year.
<b>Regional charges</b>	Regional charges consist of fixed and variable components. Beginning in 2009, 75% of Regional water costs will be recovered from the Town based on actual metered water flows multiplied by the Regional uniform water rate. Twenty-five percent (25%) of the Region's water treatment costs will be apportioned to the Town based on its proportionate share of the Region's total 3 year average historical water flows.	These charges are significant annual costs to the Town. They would vary each year depending on the Region's annual unit rate and the fluctuations in the volume of water consumed. The fixed charge will also vary depending on the Region's formula for setting this charge.
<b>Annual variations in volume consumed due to weather conditions</b>	The weather conditions have a significant influence on how much water is consumed in a given year. For example, lower temperatures and wet weather tend to result in less water consumption. Dry weather and higher temperatures increase water consumption.	The annual volume fluctuations can result in higher than anticipated Regional charges or lower revenues and lead to budget deficits. There is the need for a cost stabilization allowance to offset these variations.
<b>Consumption increase due to addition of new customers (growth)</b>	As the existing urban areas are developed, the addition of new customers would increase demand for water.	The increase in demand would increase volumes consumed and costs in the year the new customer is added.
<b>Water losses in the system</b>	The amount of water purchased by the Town from the Region should be theoretically equal to the volume sold to the consumer. Because most water systems experience a certain amount of leakage it is reasonable to expect water losses occur to some degree in the Town's system.	The difference between the volume of water purchased and the volume sold represents a potential financial loss unless the Town's rates are calculated based on the actual volumes sold (as opposed to purchased from the Region).
<b>Water quality regulations and guidelines</b>	There are new regulations under the Safe Drinking Water Act that require the Town to undertake specific activities in the interest of water quality management (e.g sampling, analysis and reporting of water quality).	These regulations are emerging and the long term impact on costs are difficult to predict. However, the costs are expected to rise as more stringent requirements are established.

Factor	Description	Cost Implications
<b>New growth related services</b>	This refers to installation of new pipes and related appurtenances to facilitate new development and build out of the approved service areas within the Town.	Would result in capital investments in the year the new infrastructure is needed and also result in increased annual water consumption.
<b>Asset preservation and renewal</b>	This involves mainly the replacement of old water mains and system appurtenances that have exceeded their service life.	Would result in future capital expenditures in the year in which the upgrades are required.
<b>Other capital expenditures</b>	These are capital expenditures other than those needed for growth and asset renewal. These would include cost of studies, Smart Meters, and implementation of operational improvements of the water system such as water loss reduction measures and new watermain loops.	Would increase costs in the year the expenditure is required.
<b>Inflation</b>	This is the annual rate of inflation as reported by Statistics Canada or the provision for cost of living allowance (COLA) adjustments each year.	Would result in annual cost increases.
<b>Debt servicing</b>	This is the annual amount needed to service any current or future debt incurred by the Town to finance capital projects.	Would increase annual costs by spreading capital costs over many years. However, using debt financing would minimize spikes in funding required for capital projects.
<b>Market competition and pricing</b>	The level of competition within the market place depends on the number of service providers available to the Town. Additionally, the capacity of industry service providers to meet the increasing demand for their services may tend to increase prices. Tender prices for future capital projects would be influenced by the market conditions at the time of tendering.	Potential higher prices depending on the future behaviour of the industry.

## 5.4 Quantifying Future Water System Costs

The factors described in Table 5-2 have different cost implications. Some are directly within the Town's control, while others are not (e.g. Regional rates, water demand fluctuations due to weather variations), depending on the factor. For example, there is flexibility with capital expenditures, as upgrades can be planned and timed to suit a particular budget strategy. Lost revenues due to unaccounted for water and costs related to demand fluctuations are more difficult to control.

Table 5-3 shows how the future cost factors apply to the water system and identifies the assumptions made for the purposes of this assessment. It is assumed that the structure of the current shared responsibility between the Region and the Town for the treatment, supply and distribution would remain unchanged, thereby leaving the responsibility for costs with the respective owners. It is also assumed that expansion of the water system will be limited to within the existing approved service areas.

**Table 5-3 - Quantification of Water System Costs**

Applicable Factor	Assumptions Regarding Future Costs	Future Cost Impact
Operations and Maintenance	<ul style="list-style-type: none"> <li>• The current O&amp;M costs are reflective of regulatory requirements. There would be no significant increase in the level of effort required to operate and maintain the water system in the future. However, an increase of 3% per year is allowed for future operational adjustments.</li> <li>• The Town's annual contribution to reserve (e.g. \$786,000 in 2010) is included in the annual O&amp;M costs.</li> </ul>	<ul style="list-style-type: none"> <li>• 2010 O&amp;M budget used as the current O&amp;M cost with 3% annual increases in future years.</li> </ul>
Niagara Region Water Supply Charges	<ul style="list-style-type: none"> <li>• The Region's rate structure of 25% fixed and 75% variable may change to possibly 50% fixed and 50% variable from 2011 on. The Town's rate projections are based on the Region's 25/75 rate structure.</li> <li>• If the Region changes its rate structure, then an adjustment to the Town's water rate calculations would be required at that time. Section 8.4 provides a projection of the Town's water rates should the Region switch to a 50/50 rate structure.</li> <li>• The consumption uniform rate established by the Region for 2010 is \$0.535 per cubic metre.</li> <li>• The Region's fixed charge to the Town for 2010 is \$3, 837.</li> <li>• The Region's charges are projected to increase significantly in the next few years based on last year's increase of approximately 13%.</li> <li>• It is assumed that these Regional rate increases include an inflationary portion of 2% annually.</li> <li>• Volume of water used to calculate the Town's annual revenues and rates is based on the 2-year average (October 2007-September 2009) plus projected growth. This is used instead of the Region's 3 year average as it more accurately reflects the lower consumption volume in recent years due to the closure of a major industrial user.</li> </ul>	<ul style="list-style-type: none"> <li>• Given that the Regional increases were approximately 13% (including inflation) for 2010, it is reasonable to assume that the Region's fixed charge would increase by 8% per year (not including inflation) from 2011-2015, and then by 6% from 2016-2034.</li> <li>• If the Region switches to a 50/50 rate structure, then the projected Regional rate increases (not including inflation) would be 6% in 2011 &amp; 2012, 5% in 2013, and 4% from 2014 onward. In addition, the projected allowance for the Region's Rate Stabilization Fund would be 6% in 2011, 7% in 2012, 8% in 2013, 9% in 2014, and remain constant at 10% from 2015 to 2034.</li> </ul>
Implementation of Annual Regional & Town Water Rates	<ul style="list-style-type: none"> <li>• The Town typically sets its annual water rates after the Region establishes its water rates usually in April/May each year. This usually results in a lag between the Region's new rate and the Town's new rate.</li> <li>• The Region's rate and the Town's rate in future years will be effective January each year.</li> </ul>	<ul style="list-style-type: none"> <li>• The water rate calculations will be based on costs in a calendar year.</li> <li>• The Regional charges for 2010 are based on: <ul style="list-style-type: none"> <li>- The 2009 rates for Jan. &amp; Feb. 2010; and</li> <li>- The 2010 rates for Mar. to Dec. 2010.</li> </ul> </li> <li>• The Town's revenues for 2010 are based on: <ul style="list-style-type: none"> <li>- The 2009 rates for Jan.-April 2010; and</li> <li>- The 2010 rates for May to Dec. 2010</li> </ul> </li> </ul>

Applicable Factor	Assumptions Regarding Future Costs	Future Cost Impact
Annual Variations in Volume Consumed Due to Weather Conditions	<ul style="list-style-type: none"> <li>Annual variations in weather conditions are unpredictable. Therefore an annual allowance is required as a contribution to a rate stabilization reserve to account for fluctuations in costs due to consumption variations.</li> </ul>	<ul style="list-style-type: none"> <li>A target rate stabilization reserve balance equal to 10% of the total Regional charges (fixed and variable) is assumed.</li> </ul>
Consumption Increase Due to Addition of New Customers	<ul style="list-style-type: none"> <li>Based on the historical data and current growth projections for housing units from the Town's Planning Department, it is expected that there will be a growth in demand.</li> </ul>	<ul style="list-style-type: none"> <li>Annual consumption would increase by 1% in 2011, 2.38% per year from 2012-2016, 2.05% per year from 2017-2021, 1.77% from 2022-2026, and 1.51% per year from 2027-2034.</li> </ul>
Unaccounted for Water	<ul style="list-style-type: none"> <li>Unaccounted for water, which includes water losses in the system, is currently estimated to be 16.84%, based on a comparison of volume purchased from the Region and volume that Hydro has billed to the Town's water customers. This percentage is considered to be high, but is expected to continue for the next few years and then decline as water loss programs or audits are undertaken.</li> </ul>	<ul style="list-style-type: none"> <li>Annual revenues would be based on the volume supplied by the Region less 16.84%.</li> </ul>
New and Emerging Regulations and Guidelines Related to Water Quality	<ul style="list-style-type: none"> <li>The implications of the Safe Drinking Water Act have already been realized for the most part. Any further cost implications of emerging regulations would be taken into account in the annual 3% increase for O&amp;M costs.</li> </ul>	<ul style="list-style-type: none"> <li>The 3% annual O&amp;M cost increases would cover any unforeseen operational adjustments due to future regulatory changes.</li> </ul>
Existing Asset Preservation and Renewal	<ul style="list-style-type: none"> <li>The timing of pipe and other asset replacement would be based on the life expectancy depending on the material type and age of the asset. The assumptions specific to asset replacement are shown in Table: 5-4.</li> <li>The cost of pipe replacement is estimated based on recent tender prices for projects issued by the Town and also within the Niagara area.</li> <li>The bulk water stations are relatively new and should not require replacement within the 25 year period.</li> </ul>	<ul style="list-style-type: none"> <li>Capital expenditures for the period 2010 to 2014 inclusive would be based on the Town's current 5-year capital plan.</li> <li>Beyond 2014, capital costs would be incurred in the years replacement of the asset is necessary, resulting in higher cost in those years.</li> </ul>
New growth related infrastructure	<ul style="list-style-type: none"> <li>The growth related capital projects would be based on the information contained in the Town's 2008 Development Charges (DC) Study.</li> <li>All project costs that are due to be funded directly by developer contributions and from DC Reserve Fund are not considered as direct cost to the Town i.e. only the net cost to the Town is considered in the future cost projections.</li> </ul>	<ul style="list-style-type: none"> <li>Growth related capital cost expenditures of \$91,340 would be incurred between 2017 and 2023.</li> </ul>

Applicable Factor	Assumptions Regarding Future Costs	Future Cost Impact
Other Capital Expenditures	<ul style="list-style-type: none"> <li>An allowance for studies, unaccounted for water reduction programs and other unforeseen capital items would be included every 5 years.</li> </ul>	<ul style="list-style-type: none"> <li>Capital costs of \$125,000 for unforeseen needs, \$20,000 for Studies, and \$100,000 for UAW reduction programs every 5 years.</li> </ul>
Inflation	<ul style="list-style-type: none"> <li>Inflation index is estimated at 2% per annum.</li> </ul>	<ul style="list-style-type: none"> <li>Annual 2% increase in cost over the long-term to account mainly for inflation.</li> </ul>
Debt Servicing	<ul style="list-style-type: none"> <li>The Town has a current debt of \$1.8 Million and plans to finance most of its capital expenditures over the next 5 years through debentures.</li> <li>Internal debt of \$700,000 owed by the Water Reserve to the Wastewater Reserve. This would be paid at no interest at \$70,000 per year for 10 years beginning in 2013.</li> </ul>	<ul style="list-style-type: none"> <li>Debt expenses of from 2010 to 2024:                             <ul style="list-style-type: none"> <li>- \$10,780 in 2010,</li> <li>- \$127,407 in 2011,</li> <li>- \$254,815 2012,</li> <li>- \$294,615 in 2013,</li> <li>- \$412,019 in 2014,</li> <li>- \$565,516 annually from 2015 to 2021,</li> <li>- \$310,701 in 2022,</li> <li>- \$270,900 in 2023, and</li> <li>- \$153,497 in 2024.</li> </ul> </li> <li>Wastewater reserve repayment of \$70,000 from 2013 to 2022.</li> </ul>
Market Competition and Pricing	<ul style="list-style-type: none"> <li>Competitive pricing would be achieved so there would be no significant cost increase due to monopolistic market conditions</li> <li>Service providers would increase their capacity to meet the increasing demand for their services</li> </ul>	<ul style="list-style-type: none"> <li>Market price increases would be captured in the annual 2% inflation index.</li> </ul>

## 5.5 Future Water System Capital Costs

The capital expenditures to be incurred over the twenty-five (25) year period from 2010 to 2034 are shown in Table 5-4. The expenditures for the period 2010-2014 are based on the Town's five (5) year capital budget. Some of these projects will be financed through a combination of debentures and the capital reserve. From 2015 onward, the capital expenditures are based on projections developed during this study and are to be mostly financed from the Capital Reserve Fund with a possibility of partial debenture financing, if necessary. Capital projects include the following:

- Pipe replacement for the period 2010 to 2034 is estimated to be \$29,483,512. This is based on a pipe replacement cost of \$675 per metre and a replacement year based on the installation date and life expectancy of pipe material;
- An allowance for studies at five (5) year intervals, each costing \$20,000;
- An allowance for Water Loss Reduction works at five-year intervals, each costing \$100,000;

- An allowance for Non-Growth Capital projects (e.g. looping, etc.) at five (5) year intervals, each costing \$125,000. These are projected costs, to be introduced at stepped intervals to lessen their cost impact; these costs can also be deferred without significant adverse effect should budgetary constraints arise; and
- The Town has anticipated growth-related projects which have been accounted for in the period from 2017 to 2023 – \$91,340 being the Town’s portion for development funding.

**Table 5-4 Water System Capital Cost Projections (Net)**

Year	Pipe Replacement - Rehabilitation	Studies	Water Loss Reduction	Growth Related Projects	Non-Growth Capital (Watermain Loops etc)	Total Capital Costs in 2010 Dollars
2010	\$33,800	\$0	\$0		\$0	\$33,800
2011	\$404,000					\$404,000
2012	\$865,400					\$865,400
2013	\$1,157,000					\$1,157,000
2014	\$926,250	\$20,000				\$946,250
2015	\$1,196,365		\$100,000			\$1,296,365
2016	\$1,196,365				\$125,000	\$1,321,365
2017	\$1,196,365			\$13,940		\$1,210,305
2018	\$1,196,365			\$5,200		\$1,201,565
2019	\$1,196,365	\$20,000		\$6,200		\$1,222,565
2020	\$1,174,548		\$100,000			\$1,274,548
2021	\$1,174,548				\$125,000	\$1,299,548
2022	\$1,174,548					\$1,174,548
2023	\$1,174,548			\$66,000		\$1,240,548
2024	\$1,174,548	\$20,000				\$1,194,548
2025	\$1,424,250		\$100,000			\$1,524,250
2026	\$1,424,250				\$125,000	\$1,549,250
2027	\$1,424,250					\$1,424,250
2028	\$1,424,250					\$1,424,250
2029	\$1,424,250	\$20,000				\$1,444,250
2030	\$1,424,250		\$100,000			\$1,524,250
2031	\$1,424,250				\$125,000	\$1,549,250
2032	\$1,424,250					\$1,424,250
2033	\$1,424,250	\$20,000				\$1,444,250
2034	\$1,424,250		\$100,000		\$125,000	\$1,240,548
<b>Subtotal</b>	<b>\$29,483,512</b>	<b>\$100,000</b>	<b>\$500,000</b>	<b>\$91,340</b>	<b>\$625,000</b>	<b>\$30,391,149</b>

Pipe material and age are the two (2) prime factors affecting pipe life expectancy. Generally, PVC, PE and concrete pressure pipe (CPP) tend to last much longer than other types. The cast iron (CI) is of particular concern because of its relatively short life expectancy. In addition, it is more difficult to maintain chlorine residuals in the watermain and the overall water quality standard in segments of the system with CI pipe. Therefore, it is desirable to replace these sooner rather than later.

CI and AC pipe replacement are the primary watermain replacement projects that would be required over the next twenty-five (25) years. The CI pipes are estimated to have a life expectancy of approximately sixty (60) years and in most cases have exceeded their life expectancies and require immediate replacement. Therefore, approximately 11,922m of CI watermain replacement is projected to be required between 2010 and 2019. AC pipes are not as critical but approximately 34,800m would be due for replacement between 2015 and 2034. The pipe replacement projects are distributed over the twenty-five (25) year period in a manner that complements the debt payment between 2010 and 2034. Accordingly, the rates are expected to be more stable.

The unit cost for watermain replacement is based on prices used by the Town for budgeting, discussions with local contractors and recent tender prices for projects undertaken by the Town and within Niagara. The unit price shown assumes good soil conditions and includes engineering fees, valves, laterals to property line hydrants and blow-offs, and restoration.

## 5.6 Net Full Costs – Water System

The net full cost of managing the water system over the next twenty-five (25) years is the realistic estimation of full costs and is comprised of:

- *Net* Annual O&M Costs (i.e. after daily program revenues are considered);
- *Net* Capital costs (pipe replacement, growth and non growth projects) i.e. not including contributions from developers or grants;
- Water treatment (Regional) costs;
- Water treatment (Regional) costs due to growth;
- Rate stabilization allowance;
- Capital reserve contributions; and
- Debt Repayment.

The net full cost of managing the water system includes program revenues and contributions from developers and the Development Charges Reserve Fund; the calculations are presented in Appendix E: Full Cost Calculations (Net) for Water Systems. The annual net O&M costs are projected to increase by 3% per year beyond 2010 to account for operational changes due to evolving regulatory requirements.

The capital expenditures projected for the period 2010 to 2034 relate mainly to pipe replacement and rehabilitation. These are based on the estimates presented in Table 5-5: Composition of Levelized Net Costs (in \$1,000 in 2010 Dollars - Water) and the assumptions in this section. The estimates used for Regional costs (treatment) and volume stabilization are also shown in Appendix E.

The full cost (based on net costs) of managing the Town water system varies each year throughout the twenty-five (25) year period, increasing from \$3,837,045 in 2010 to approximately \$13,856,462 in 2034. Based on a discount rate of 4%, the full cost of managing the water system over the twenty-five (25) year period is estimated to be \$126,311,434. The equivalent constant annual full cost the Town would incur each year during the period 2010 to 2034 is estimated to be \$8,085,443. This represents an increase of approximately \$3,982,082 net over the 2010 annual budget of \$3,991,273. However, it is important to note that the 2011 annual cost is not required to be \$8,085,443. This is the annual amount that would be required if the total cost over the twenty-five (25) year period is levelized into twenty-five (25) equal annual amounts. This can be



partly attributed to the pipe replacement needs and increasing costs associated with treatment and supply and regulatory changes. Based on the projected water consumption, the levelised full cost is estimated to be \$2.867/m<sup>3</sup> for each year. These costs are in 2010 dollars and would require annual adjustments to reflect inflation.

As shown in Table 5-5, approximately 53% of the annual cost over the next twenty-five (25) years is for treatment and supply from the Region. Operations and maintenance (O&M) account for 18% and pipe replacement accounts for 14% of the cost. Contributions to the Capital Reserve Fund and debt repayment account for approximately 11% and 4% respectively.

**Table 5-5 - Composition of Levelized Net Cost (in \$1,000) in 2010 Dollars - Water**

Cost Component	NPV Cost	Levelized Annual Cost	Unit Cost (\$/m <sup>3</sup> )	%
Capital - Pipe Replacement	\$17,375.76	\$1,112.26	0.394	13.76%
Capital - Studies	\$50.18	\$3.21	0.001	0.04%
Capital - Loss Reduction Program	\$278.78	\$17.84	0.006	0.22%
Capital - Growth	\$56.14	\$3.59	0.001	0.04%
Capital - Other (Looping etc)	\$336.87	\$21.56	0.008	0.27%
Water Purchase - Region Fixed Charge (25%)	\$16,386.43	\$1,048.93	0.372	12.97%
Water Purchase - Region Variable Charge (75%)	\$49,181.45	\$3,148.20	1.116	38.94%
Water Purchase - Region Fixed Charge (Growth)	\$340.89	\$21.82	0.008	0.27%
Water Purchase - Region Variable Charge (Growth)	\$862.28	\$55.20	0.020	0.68%
Rate Stabilization Allowance	\$571.65	\$36.59	0.013	0.45%
Contribution to Capital Reserve	\$13,596.06	\$870.31	0.309	10.76%
O&M	\$22,606.92	\$1,447.11	0.513	17.90%
Debt Payment	\$4,668.02	\$298.81	0.106	3.7%
<b>Total Levelized Annual Net Costs (in 2010 \$)</b>	<b>\$126,311.43</b>	<b>\$8,085.443</b>	<b>\$2.867</b>	<b>100%</b>

## 6 Meeting O.Reg 453/07 Requirements

As noted in Section 2.2, a financial plan is required in accordance with O.Reg 453/07 to meet the DWQMS water system licensing requirements. The financial information required to meet this regulation is presented in Appendix F in tabular form, addressing each requirement. Table F1 in Appendix F describes each requirement and how each of these requirements will be met. In addition, this table describes various terms in relation to O. Reg 453/07 and the preparation of this report.

In general, the period to which this financial plan applies is twenty-five (25) years which exceeds the minimum six (6) year requirement under O.Reg 453/07. It is anticipated that this financial plan would be made available to the public at no charge and posted on the Town's website, following final approval of the plan by resolution of the Town Council. This will be confirmed through separate correspondence at the time of submission by the due date.



## PART II – Full Cost Recovery

This part of the report presents the optional rates and charges for recovering the full costs associated with the management of the Town’s water system. The NET Full Cost considers the program revenues which offset a portion of the gross costs. These revenues are expected to be generated as part of the daily management of the water systems. Therefore, the Net Full Costs are more representative (than Gross Full Costs) of the amounts to be recovered to fully finance the water systems.

### 7 Financing the Water System Costs

#### 7.1 Water System Financing

The current methods of financing for each cost component are summarized in Table 7-1. In general, capital projects are funded through a combination of reserve funds and debentures. The reserve funds are built through annual contributions included in the water rates and charges each year. Growth related projects are funded primarily through the Development Charges (DC) Reserve in accordance with the Development Charges Act and direct developer contributions. Any additional funding from the Town for growth related projects is usually from the capital reserve fund. Therefore, only the “net” funding required through the capital reserve fund is considered for growth related projects in this study. All other costs are recovered through the annual rates and charges. Periodically, specific projects and activities may be funded by grants available through Federal and Provincial Government funding programs. However, this form of financing is not always available and therefore it is not considered in this study to be a sustainable source of financing.

**Table 7-1 – Current Funding Sources**

<b>Item</b>	<b>Funding Source</b>
O&M	<ul style="list-style-type: none"> <li>• Rates</li> </ul>
Growth Projects	<ul style="list-style-type: none"> <li>• DC Reserve Fund</li> <li>• Developer Contributions</li> <li>• Capital Reserve Fund</li> </ul>
Watermain Replacement	<ul style="list-style-type: none"> <li>• Capital Reserve Fund</li> <li>• Debentures</li> </ul>
Other Capital	<ul style="list-style-type: none"> <li>• Capital Reserve Fund</li> </ul>
Compliance/System Improvements	<ul style="list-style-type: none"> <li>• Rates</li> </ul>
Region’s Charges	<ul style="list-style-type: none"> <li>• Rates</li> </ul>

## 7.2 Current Rates & Charges

In 2005, the Town reviewed alternative rate structures and implemented a fixed monthly charge per unit plus a uniform consumption charge to recover its costs for water services. The key features of this rate structure are:

- It provides stability in the revenue stream with the guaranteed revenues from the fixed charge; and
- This structure has all of the benefits of a uniform rate (e.g. promoting water conservation), but without the extreme volatility of recovering all costs through a consumption rate as occurred in the past.

Each year, the Town sets its rates after the Region's charges for the purchase of treated water are known. The Region's timing for setting its rates and charges varies but is usually approved and takes effect by February or March each year. The Region's 2010 rates and charges to the Area Municipalities became effective on March 1, 2010 and the Town's 2010 rates and charges to its customers took effect from May 1, 2010. Based on recent discussions between Regional and Area Municipal staff, the objective in future years is to have both sets of rates become effective in January.

The Town's approved rates for 2010 based on the current rate structure are:

- Fixed Monthly Charge per Unit = \$18.55
- Uniform Consumption Rate per Cubic Metre = \$1.1290

The Town wishes to consider having the monthly charges based on the size of the water meter instead of per unit. This is to address one major issue with respect to the fixed charge component of the current rate structure. Multi-residential unit properties have indicated that because the fixed charge is assessed per unit, their total fixed monthly charges are unduly high and perhaps unfair because they pay based on the number of units serviced at their respective properties. This proposed rate update is intended to address this issue, by considering the option of moving to a fixed charge based on meter size, in accordance with the American Waterworks Association (AWWA) standards.

## 8 Water Rates and Charges

The key principles described in Section 8.1 were for the most part used as the basis for establishing the Town's current rate structure. These were also taken into consideration in updating the rates in this section of the report. Previously, debenture financing of capital projects was avoided. The Town has since decided to utilize this form of financing as appropriate, in combination with reserve funds. Owing to the uncertainty of the future demand patterns and the risk of not recovering sufficient revenues in a particular year due to lower than expected demand, there is the need to establish a rate stabilization fund that can be used to offset deficits should they occur.

The potential reserve fund levels and impact of each set of options on customers were identified and reviewed by the Town's Senior Management staff.

Two (2) options for rates and charges are presented in Section 8.2. These are based on the Region's current rate structure of 25% fixed and 75% variable. However, the Region has indicated that it plans to consider changing its rate structure beginning in 2011 to 50% fixed and 50% variable instead of its current 25% fixed and 75% variable, and establish its own rate stabilization fund of 5% to 10% of its revenues. There are still uncertainties surrounding these potential changes by the Region including whether or not they would be phased in over a few

years. In an effort to gauge the potential implication to the Town, Section 8.4 of this report provides a projection of the impact on the Town's rates and charges should these changes occur in 2011, based on the assumptions noted.

## 8.1 Guiding Principles

The following are the guiding principles that were considered in updating the Town's water rates:

1. **Full Cost Recovery** – The full costs of managing the water system should be recovered through the rates and charges to sustain adequate financing for the water systems (as required by the Sustainable Water Systems Act);
2. **Reduce wasteful uses / promote justified uses (of water)** - This encourages customers with peak demands that are significantly higher than their normal demands to reduce consumption; it reduces the impact to customers with normally high demands (e.g. industry where demand tends to be consistent);
3. **Fairness and reasonableness (avoid discrimination)** - The rate structure should not unduly benefit or adversely affect one customer class over another;
4. **Ease of Administration** - Rate structure should be simple; this would serve to minimize administration costs and facilitate easy understanding by customers;
5. **Stability** – Major fluctuations in the rates and charges from year to year should be avoided by establishing and utilizing a rate stabilization reserve fund. The rates should also provide predictability in terms of revenues each year;
6. **Industry promotion** - The Town has not indicated a wish to support the growth of any particular industry by providing some incentives in the rate structure to that specific industry. However, all industries will be treated equitably;
7. **Address problems / issues with existing rates** - Any issues with the current rate structure should be identified and addressed in the rate and charges update;
8. **Financing to Include Debt** - The capital projects related to the water system should be financed through combination of debentures and transfers from the water reserve fund; and
9. **Reserve Funds** – Reserve balances must be able to address the needs of at least the next three (3) to five (5) years. Reserve funds should be established but not unduly overbuilt.

## 8.2 Water Rates & Charges Options

The two (2) options for updating the water rates and charges are presented in Table 8-1 and are as follows:

- Option 1 (the “do nothing” option) – Fixed Monthly Charge per Unit plus Uniform Rate.

This option involves increasing the current 2010 rates for 2011 and each year thereafter so that sufficient revenue can be generated annually to cover the annual costs over the twenty-five (25) year period.

- Option 2 – Fixed Monthly Charge based on Meter Size plus Uniform Rate.

This option is based on using the current 2010 fixed charge per unit as the base monthly charge for a standard size water service that uses either a 5/8” or 3/4” meter. The fixed charge for the larger meter sizes are based on the factors recommended by the AWWA. These are listed in Table 8-2 and are considered to be industry best practice regarding their use in allocating fixed charges. This option is also based on maintaining the same 2011 uniform rate as for Option 1 (i.e. redistributing the fixed charge only).

**Table 8-1 - Alternative Water Rates for 2011**

<b>Water Rate Alternatives</b>	<b>Fixed Monthly Charge (\$/Month)</b>	<b>Uniform Consumption Rate (\$/m3)</b>
<i>Option 1</i> <i>Fixed Monthly Charge - Per Unit &amp; Uniform Consumption Rate</i>	\$20.03	\$1.2249
<i>Option 2</i> <i>Fixed Monthly Charge (Based on Meter Size) &amp; Uniform Consumption Charge</i>	<ul style="list-style-type: none"> <li>• 5/8” - \$20.03</li> <li>• 3/4” - \$20.03</li> <li>• 1” - \$28.05</li> <li>• 1-1/2” - \$36.06</li> <li>• 2” - \$58.10</li> <li>• 3” - \$220.37</li> <li>• 4” - \$280.48</li> <li>• 6” - \$420.71</li> <li>• 8” - \$580.99</li> <li>• 10” - \$801.36</li> </ul>	\$1.2249 ( same as Option 1)

**Table 8-2 – A.W.W.A. Meter Equivalency Factors**

Meter Size	A.W.W.A. Meter Equivalency Factor
5/8" (15mm) x 3/4" (18mm)	1
3/4" (18mm)	1
1" (25mm)	1.4
1-1/2" (37mm)	1.8
2" (50mm)	2.9
3" (75mm)	11
4" (100mm)	14
6" (150mm)	21
8" (200mm)	29
10" (250mm)	40

Appendix G shows the projections for Option 1 over the twenty-five (25) year period. It identifies the projected fixed charges, uniform consumption rates, revenues and reserve balances for each year in order to cover the projected costs. Appendix H shows the projected information for Option 2.

It is important to note that these projections assume that the Region and Town will implement their respective annual rates and charges in January each year. If there is a lag in implementation, then the projections shown would require adjustments to account for using the rates and charges from a particular year into the subsequent year. To facilitate adjustments to the projections, an Excel “tool” is provided separately to model the rates and charges each year as actual numbers replace projected numbers.

A summary comparison of the two (2) options is provided in Table 8-3.

**Table 8-3 Summary Comparison of Options**

Item	Option 1 (Fixed Charge/ Unit)	Option 2 (Fixed Charge based on Meter Size)
Fixed charges	<ul style="list-style-type: none"> <li>• Increases by 8% in 2011 to \$20.03/ month from \$18.55/ month in 2010.</li> <li>• Annual increases of approximately 7% from 2012 to 2017 and 3% from 2018 to 2027, and 5% thereafter to 2034.</li> </ul>	<ul style="list-style-type: none"> <li>• Increases by 8% in 2011 to \$20.03/ month from \$18.55/ month in 2010 (same as Option 1).</li> <li>• Annual increases of 8% from 2012 to 2015.</li> <li>• 7% increase in 2016.</li> <li>• 6% increase in 2017.</li> <li>• 2% to 3% from 2018 to 2026.</li> <li>• 4% increase from 2027 to 2034.</li> </ul>
Uniform rates	<ul style="list-style-type: none"> <li>• Increases by 8.5% to \$1.2249/m<sup>3</sup> in 2011 from \$1.1290/m<sup>3</sup>.</li> <li>• Annual increases of approximately 9% from 2012 to 2016, then 7% in 2017 and 2018, 6% from 2019 to 2027, and 7% from 2028 to 2034.</li> </ul>	<ul style="list-style-type: none"> <li>• Increases by 8.5% to \$1.2249/m<sup>3</sup> in 2011 from \$1.1290/m<sup>3</sup> (same as Option 1).</li> <li>• Annual increases of approximately 8% from 2012 to 2015.</li> <li>• 7% annual increase from 2016 to 2019.</li> <li>• 6% from 2020 to 2027.</li> <li>• 7% from 2028 to 2034.</li> </ul>
Rate Stabilization Reserve Fund Balances	<ul style="list-style-type: none"> <li>• Ranges between \$219,000 and \$400,000 between 2011 and 2019.</li> <li>• Ranges between \$400,000 and \$1,141,000 between 2020 and 2034.</li> <li>• The target reserve balance equates to 10% of forecasted Regional charges (fixed &amp; variable) each year.</li> </ul>	<ul style="list-style-type: none"> <li>• Same as Option 1.</li> </ul>

Item	Option 1 (Fixed Charge/ Unit)	Option 2 (Fixed Charge based on Meter Size)
Capital Reserve Fund Balances	<ul style="list-style-type: none"> <li>• \$796,000 at end of 2010.</li> <li>• \$1,059,000 to \$711,000 between 2011 and 2014.</li> <li>• \$342,000 to \$136,000 in 2015 and 2016.</li> <li>• \$190,000 to \$541,000 between 2017 and 2020.</li> <li>• \$369,000 to \$730,000 from 2021 to 2023.</li> <li>• Ranges between \$1,191,000 and \$882,000 from 2024 to 2031.</li> <li>• \$968,000 to \$791,000 from 2032 to 2034.</li> </ul>	<ul style="list-style-type: none"> <li>• \$796,000 at end of 2010.</li> <li>• \$1,112,000 to \$914,000 between 2011 and 2014.</li> <li>• \$560,000 to \$300,000 between 2015 and 2020.</li> <li>• \$100,000 to \$250,000 between 2021 and 2023.</li> <li>• \$380,000 to \$430,000 between 2024 and 2031.</li> <li>• \$600,000 to \$792,000 between 2032 and 2034.</li> </ul>
Proportion of Fixed versus Consumption Based Revenue	<ul style="list-style-type: none"> <li>• Revenues from fixed charges form approximately 34% of the overall revenues in 2011.</li> <li>• Revenues generated by the uniform consumption rate is approximately 66% of overall revenues in 2011.</li> <li>• This changes to approximately 30% fixed and 70% consumption based by 2027.</li> </ul>	<ul style="list-style-type: none"> <li>• Revenues from fixed charges form approximately 35% to 37% of the overall revenues between 2010 and 2021.</li> <li>• Revenues generated by the uniform consumption rate is approximately 64% to 65% of overall revenues.</li> <li>• This changes to approximately 30% fixed and 70% consumption based by 2030.</li> </ul>
Multi residential Property Fixed Charges	Does not address the fixed charge issue noted for multi residential properties.	Addresses the multi residential property issue by shifting some of the fixed cost to the customers that use the most water (i.e. with the larger meters).

### 8.3 Recommended Water Rates & Charges

A comparison of the two (2) options based on the information in Appendices G and H, as summarized in Table 8-3, suggest that:

- Both Options are projected to provide adequate revenues to offset the projected costs over the twenty-five (25) year period;
- Both Options would provide sufficient reserve balances throughout the period, based on the assumptions noted in Table 5.3;

- Both Options would require the same rate and fixed charge increases in 2011;
- Both Options offer similar uniform rate increases beyond 2011;
- Both Options offer similar fixed charge increases between 2012 and 2017. However, the annual increases for Option 2 are slightly less than for Option 1 beyond 2017;
- Both Options offer the same rate stabilization reserve fund balances;
- Both project the same Capital Reserve balances at the end of 2010; and
- Option 2 projects higher reserve balances (\$100,000 to \$200,000 more) over the next four (4) years.

Option 2 would be preferred and is recommended for the following reasons:

- It addresses the issue of fairness and equity regarding the fixed charge to multi residential properties;
- A slightly greater portion (36%) of the revenues is generated through the fixed charges compared to 34% for Option 1 and is projected to remain at this ratio for a longer period (to 2030). Therefore, Option 2 appears to offer less risk by relying less on revenues influenced by variations in consumption; and
- Option 2 also offers higher reserve balances over the short-term (2011 to 2014).

Appendix I shows the projected annual cash flows, surpluses, deficits, transfers to and from reserves and reserve balances for Option 2.

If the Region decides to implement the proposed change in its rate structure to 50% fixed and 50% variable, then the Option 2 projections would require recalculation. In that case, it is recommended that the Town considers and discusses the information presented in Section 8.4 with the Region as the basis for moving ahead.

## **8.4 Region's 50/50 Rate Structure**

This section presents a projection of the Town's rates and charges over the twenty-five (25) year period should the Region implement the proposed 50% fixed and 50% variable rate structure for charging the Area Municipalities. The assumptions made with respect to the Region's charges in 2011 are as follows:

- The Region would implement the new rate structure in 2011 (i.e. not phase it in);
- The Region's total estimated cost for 2011 would be 10% higher than 2010 costs;
- The Region would begin establishing a rate stabilization reserve fund with an annual contribution equivalent to 6% of the Region's 2011 estimated costs. This percentage would rise to 7% in 2012, 8% in 2013, 9% in 2014 and 10% thereafter;
- The total volume of water projected to be sold by the Region in 2011 would be 3% less than the volume projected to be sold in 2010, using the rolling three (3) year average volumes;
- The Region's fixed charge to the Town would be based on the Town's proportionate share of 50% of the Region's projected 2011 costs (including the rate stabilization contribution). The Town's proportionate share would be equal to the annual volume of water purchased by the Town divided by the total volume of water sold by the Region, and calculated using the rolling three (3) year annual average volumes; and



- The Region’s uniform consumption charge to the Area Municipalities would be calculated by dividing 50% of the Region’s projected 2011 costs (including the rate stabilization contribution) by the Total volume of water projected to be sold, using the rolling annual three (3) year average volumes.

However, it should be noted that the actual methods to be used by the Region for determining the allocation of fixed charges to the Area Municipalities and the uniform consumption rate will be decided based on meetings with representatives of the Area Municipalities. The projections of the Region’s rates and charges for the period 2011 to 2015, based on the foregoing assumptions, are presented in Table J11 in Appendix J. Tables J1 through J9 in Appendix J show the projected Town rates and charges and reserve balances for the twenty-five (25) year study period using the current rate structure of a fixed monthly charge based on meter size plus a uniform consumption rate. All costs are the same as in Option 2 except for the Region’s charges.

The primary implications would be as follows:

- Approximately 42% of the Town’s revenue in 2012 would be generated by the monthly fixed charge and 58% from the uniform consumption rate. This would change to 48% fixed and 52% variable by 2020 and then to 50% fixed and 50% variable by 2022. This would reduce the risk of deficits due to unpredictable consumption volumes.
- The impact to the Town’s rates would be phased in as indicated in Table 8-4.

**Table 8-4 - Town’s Rate Increases**

	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>
Fixed Charge Increases	26%	18%	12%	10%	6%
Uniform Rate Increases	-6%	10%	10%	7%	6%

The Town’s uniform consumption rate would be reduced from \$1.1290/ m3 in 2010 by approximately 6% to \$1.0652/m3 in 2011. The uniform rate increases for 2012 to 2015 are shown in Table 8-4. The rate would increase by approximately 3% to 4% each year between 2016 and 2034.

- The Town’s base fixed monthly charge (i.e. for a typical residential water meter) would increase in 2011 by approximately 26% to \$23.37 from \$18.55 in 2010. The fixed charge increases projected for 2012 to 2015 are shown in Table 8-4. The projected increases would be approximately 5% to 6% in 2016 and 2017, then 2% to 3% thereafter to 2034.
- The timing of the pipe replacement projects would be adjusted (compared to Option 2) so that most (32,619m out of 34,800m or 94%) of the AC pipe would be replaced between 2020 and 2034. This is shown in Table J10 of Appendix J.
- The capital reserve balance is projected to be approximately \$950,000 to \$975,000 by 2012, then \$500,000 to \$837,000 by 2018, then \$800,000 to \$1,300,000 from 2019 to 2026, then between \$600,000 and \$900,000 from 2027 to 2034, with a decline to \$100,000 for two (2) years during this period.
- In 2011, an operating deficit of approximately \$200,000 is projected. However, this can be offset by transfers from the Capital Reserve Fund (one time only), leaving a reserve balance of approximately \$978,000.

- The Town's rate stabilization fund would remain similar to Option 2 with a projected balance of approximately \$241,000 in 2012, increasing to approximately \$1,141,000 by 2034.

## 9 Conclusions and Recommendations

### 9.1 Conclusions

Based on the information contained in this report, the following are our main conclusions with respect to water system financing:

1. The Town of Niagara-on-the-Lake's water system is comprised of approximately 189.7 kilometres of watermain with a value estimated at \$132,784,400. PVC forms most (64%) of the Town's pipe network. The remaining pipes are mainly asbestos cement (27%) and cast iron (6%).
2. A significant portion (64%) of the overall system is less than thirty (30) years old. Almost all the PVC pipe falls into this age group. On the other hand, most of the cast iron pipe is approximately seventy-five (75) years old or of unknown age. The asbestos cement (AC) pipe is generally over fifty-five (55) years old. This suggests that there is a major need for replacement of the cast iron pipe and AC pipe.
3. The actual cost of managing the Town's water system in 2010 is anticipated to be \$4,204,073 (gross) and \$3,991,273 (net). A significant portion (54%) is related to water treatment and supply, 26% for O&M and 20% for capital contributions to reserve. A small percentage (0.27%) is related to debt charges.
4. Approximately 16.8% of water supplied to the Town is unaccounted for and considered to be "non-revenue generating" volumes. This may be due to a combination of items including but not limited to system flushing, fire fighting, system losses, street washing etc. However an audit needs to be undertaken by the Town to identify the reasons for this relatively high percentage and possible steps towards reducing the "non-revenue generating" volumes.
5. The full cost of managing the Town's water system over the next twenty-five (25) years based on *net* costs is estimated to be \$8,085,443 annually or \$2.87 per cubic metre. It is important to note that the 2011 annual cost is not required to be \$8,085,443. This is the annual amount that would be required if the total cost over the twenty-five (25) year period is levelized into twenty-five (25) equal annual amounts. Approximately 53% of these costs are for the Region's charge, followed by 18% for O&M, 14% for pipe replacement, 11% for contributions to the Capital Reserve Fund and 4% for debt repayment.
6. Options 1 and 2 are projected to provide for the necessary full cost recovery over the next twenty-five (25) years. The projected fixed monthly charge and uniform rate under Option 1 & 2 are shown in Table 8-1. Option 2 appears to provide more sustainable financing over the next four (4) years, and also addresses the current multi-residential issue regarding the fixed monthly charge per unit.
7. Implementation of the Region's new rate structure of 50% fixed and 50% variable in 2011 (based on the assumptions noted and a phased-in approach) would require the following:
  - An increase of 26% in 2011, 18% in 2012, 12% in 2013, 10% in 2014, and 6% in 2015 to the Town's fixed monthly charge based on meter size (Option 2); and
  - A reduction of approximately 6% to the uniform consumption rate in 2011, followed by increases of 10% in 2012, 10% in 2013, 7% in 2014, and 6% in 2015.

Approximately 42% of the Town's revenue in 2012 would be generated by the monthly fixed charge and 58% from the uniform consumption rate. This would change to 48% fixed and 52% variable by 2020 and then to 50% fixed and 50% variable by 2022.

The capital reserve balance is projected to be approximately \$950,000 to \$975,000 by 2012, then \$500,000 to \$837,000 by 2018, then \$800,000 to \$1,300,000 from 2019 to 2026, then between \$600,000 and \$900,000 from 2027 to 2034, with a decline to \$100,000 for two (2) years during this period.

## 9.2 Recommendations

The following are our main recommendations with respect to water system financing:

1. Update the current water rates to facilitate recovery of the full costs associated with management of the water system over the next twenty-five (25) years;
2. Use the Net Full Cost as the basis for updating the water rate as the net cost considers revenues that would normally be expected as part of the business operations;
3. Consider the establishment of a rate stabilization reserve fund to address annual fluctuations in consumption and related cost and revenue variations. This reserve should be maintained at approximately 10% of the Region's total charge to the Town (i.e. fixed and consumption charges);
4. The rates and charges noted in Option 2 should be considered for implementation by the Town beginning in 2011;
5. If the Region decides to change its rate structure to 50% fixed and 50% variable in 2011, then the Town should consider the projections shown in Section 8.4 and discuss these with the Region prior to setting its new rates and charges;
6. The Town's current debt repayment schedule indicates annual repayment costs of approximately \$600,000 to \$700,000 for a ten (10) year period. This is anticipated to result in higher water rates than would otherwise be required if the debt were to be repaid over a longer period. Therefore, consideration should be given to repayment of debt over a longer period than currently planned; and
7. The volume of water purchased by the Town as noted in the 2009 record of Water Requisition from the Region, when compared to the volume billed to customers, indicates an apparent significant unaccounted for water volume of approximately 16.8%; an audit should be conducted to determine the reasons for this difference, with a view to reducing the unaccounted for water volumes (i.e. Increasing the revenue generating volumes).

## 10 References

1. Town of Niagara-on-the-Lake Development Charges Study (2008)
2. Town of Niagara-on-the-Lake 2010- 2014 Water Capital Budget (5 year program)
3. Water Consumption Records – Niagara Region
4. Town of Niagara-on-the-Lake Water Asset Inventory (2009)
5. Town of Niagara-on-the-Lake PSAB data