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# WINDSOR UTILITIES COMMISSION WATER RATE STUDY EXECUTIVE SUMMARY

The Commission retained the services of Earth Tech Canada Inc. and Watson & Associates Economists Ltd. to undertake a water rate study which complied with emerging regulations and forecasted rates out over a 10 year planning horizon. As the soon to be approved legislation places a heavy emphasis on asset management and full cost pricing, a detailed review of the Commission's infrastructure was undertaken and the calculated rates provided herein incorporate this long term replacement plan.

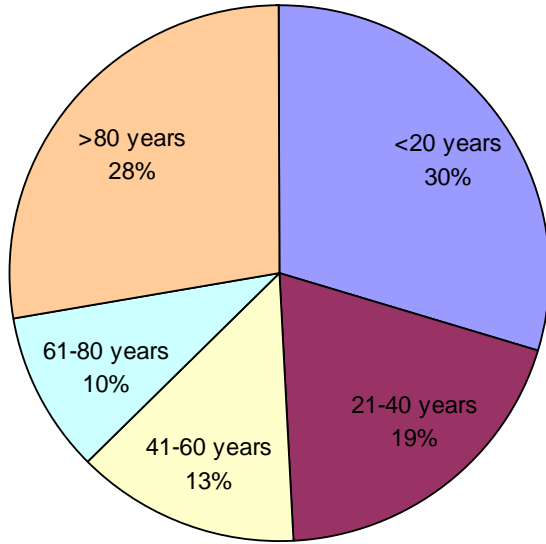
Significant legislative changes have been implemented in recent years as a result of the recommendations of the Walkerton Inquiry. The *Sustainable Water and Sewage Systems Act* (SWSSA) was given Royal Assent in December, 2002; however the regulations to implement this Act have yet to be approved. This Act specifically deals with the development of long term asset management plans for water and wastewater systems and for these plans to be incorporated into the rates. The Province has circulated draft interim legislation (under the *Safe Drinking Water Act*) which will implement the same principles but in a less prescriptive manner. Approval of this regulation is expected in August 2007.

As the planning period for this review was 10 years, a forecast of the number of customers and billable volumes was undertaken. To be conservative in the forecast, non-residential customers (and flows) were held constant. Residential growth was forecast at 1,000 customers per year with an average consumption of 294 m<sup>3</sup>.

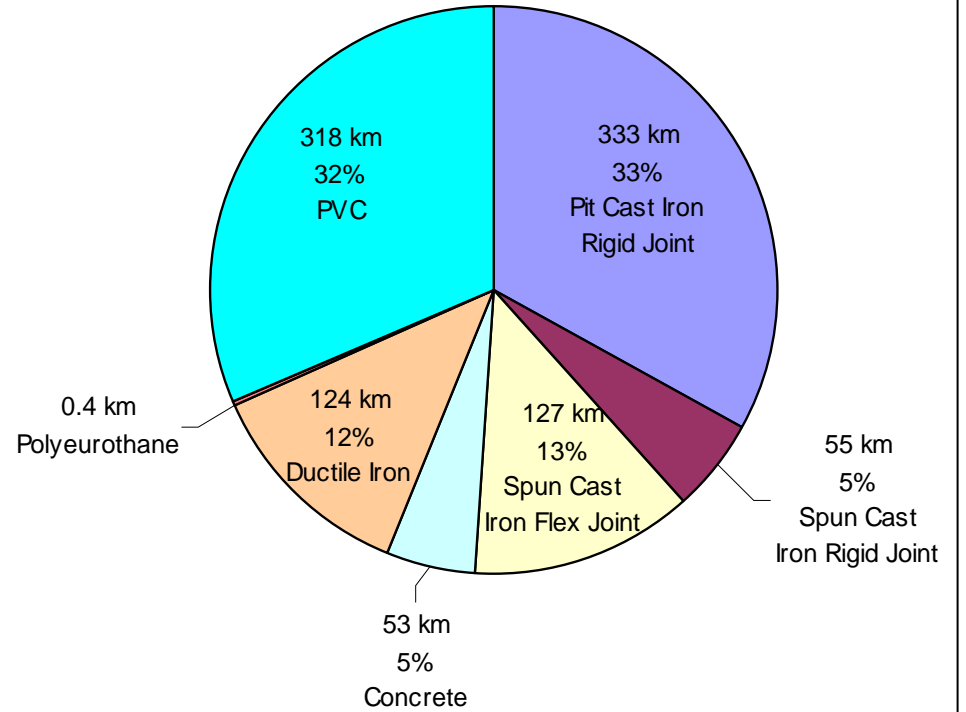
The WUC's 1,026 km water distribution system dates back to 1889. Approximately 50% of the water distribution system will reach its life expectancy in the next 20 years given the cast iron material utilized as shown by Figure EX1. Based on our life cycle analysis this equates to approximately \$37.5 million in backlog and annual expenditures in 2007 dollars (uninflated), ranging from \$8.2 million to a high of approximately \$26 million over the next 20 to 25 years as shown by Figure EX2. This averages out to an annual average expenditures over the first 10 years of \$17 million annually, and the later 15 years of \$16 million annually. Over the entire 100

**Figure: Ex 1**

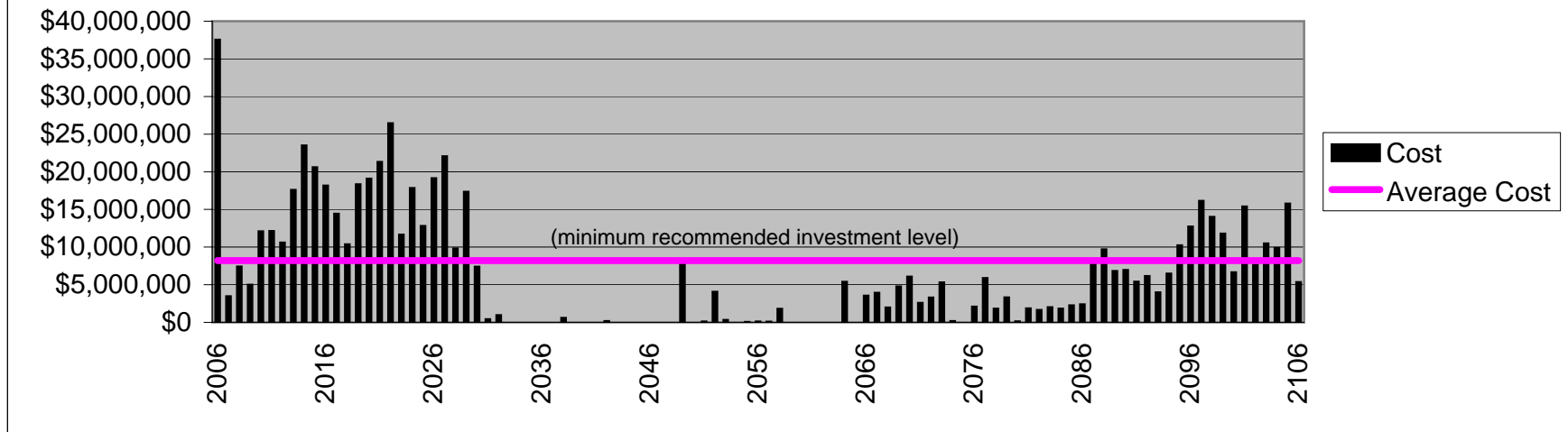
**Pipe Age Distribution**



**Distribution of Pipe Material**



**Figure EX2: Lifecycle Costs**



**Key Stats**

Total Value of Assets	\$ 662,790,755	(1,2,3)
Lifecycle Average Cost per Year	\$ 8,203,204	(minimum recommended investment level)
Length of Watermain (km)	1,026	

**Average Replacement Costs of Expired Watermains (4)**

10 Years	\$ 16,793,847
25 Years	\$ 15,844,102
50 Years	\$ 8,203,204
75 Years	\$ 6,184,946
100 Years	\$ 6,627,908

**Watermain Infrastructure Renewal Needs Report (5)**

50 Years	\$ 7,200,000
% Difference	12.2%

**Notes:**

- (1) For Watermains with unknown construction year and known material, the construction year was estimated by a straight line approach using the watermain unit replacement costs and the Era Installed.
- (2) For Watermains with known construction year and unknown material, the material was estimated using the Era Installed.
- (3) For Watermains with unknown construction year and unknown material, construction year and material estimated based on proximity to known watermain
- (4) Sum of Replacement Costs for the Period of Interest
- (5) Watermain Infrastructure Renewal Needs Report, Windsor Utilities Commission, Sept 2002

year life cycle analysis this represents annual minimum expenditure (2007 dollars, uninflated), of \$8.2 M, and a total asset value of \$662 million.

The above emphasizes the need for proactive Asset Management already initiated by the WUC to address current and/or pending legislative requirements as shown by Figure EX3.

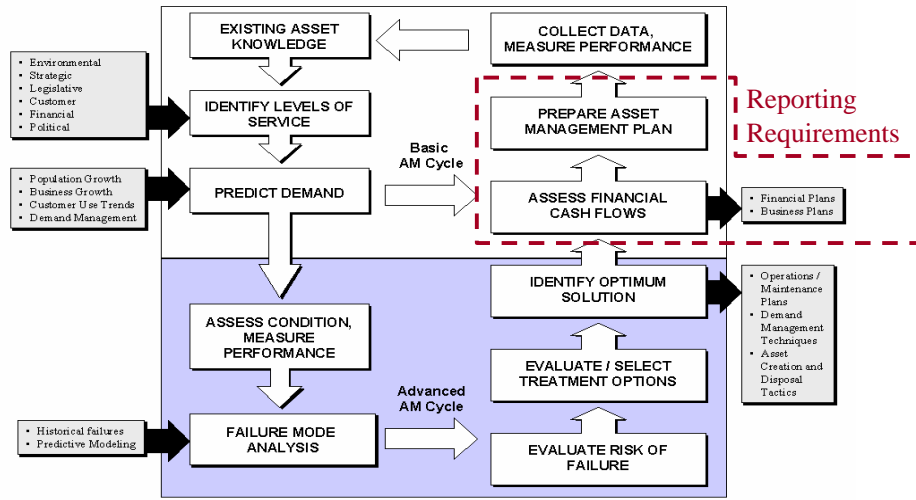
A life cycle analysis was also completed for the WUC's water related facilities. Field investigations were undertaken for each facility by Earth Tech and WUC personnel. A number of short-term replacement items, over and above that already identified through the WUC's budget process, were identified as shown by Figure EX4, with additional annualized funding required to address the outputs of our life cycle analysis. Annual expenditures in the range of \$3.2 million are recommended to maintain the City's water treatment, pumping and storage distribution facilities into the future consistent with Infraguide and National Benchmarking recommendations, and to meet SDWA and other legislative requirements.

Based on the above watermain distribution system and facility life cycle analysis, and adding in other miscellaneous capital and/or growth related requirements for the WUC, generated the following 20 year forecast that should be addressed by the WUC's 5 and 10-year budgeting process and the Cost Recovery Plan required by the Sustainable Water and Sewage Systems Act (see Figure EX5).

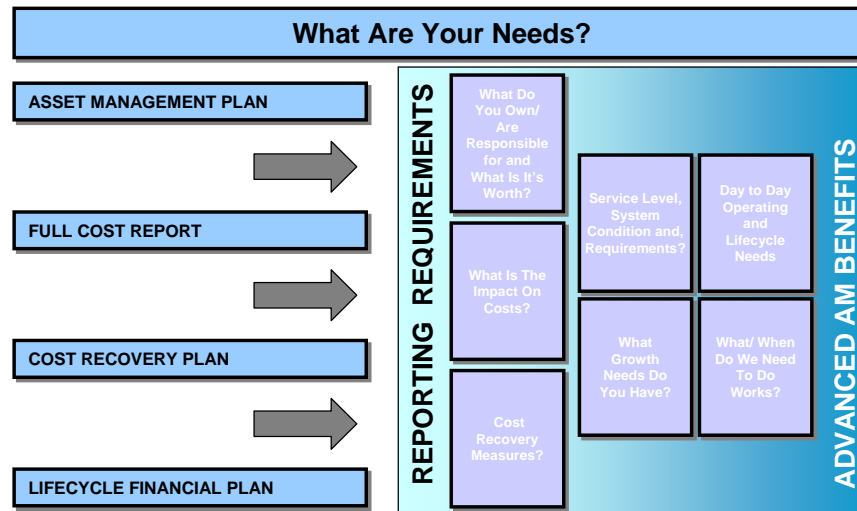
A 10 year capital plan was developed at a cost of \$312 million (inflated dollars), to address the above as shown below for rate determination purposes.

Description	Total
<b>Capital Expenditures</b>	
<b>Water Replacement and Improvements:</b>	
Engineering	1,483,100
Transmission & Distribution Facilities	5,464,500
Distribution System Renewal and Improvements	26,029,000
Meter Replacement	210,946,100
SCADA Implementation	13,299,800
Other Miscellaneous System Improvements	4,120,800
<b>Growth Related Works:</b>	
Growth Watermains	5,474,700
Growth Facilities	15,084,300
Total Capital Expenditures	30,561,900
	312,464,200

### Asset Management Strategy



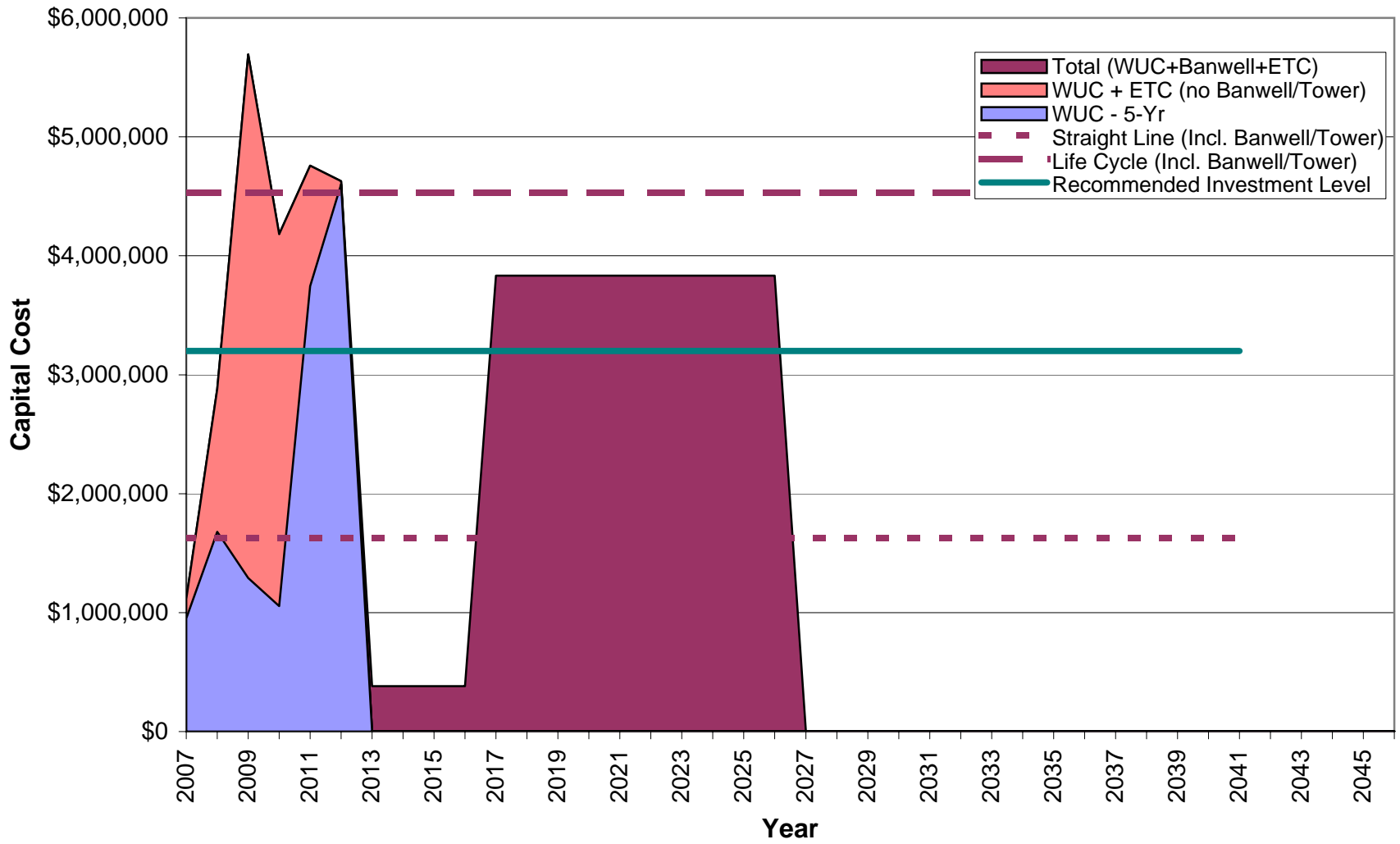
## Asset Management Approach



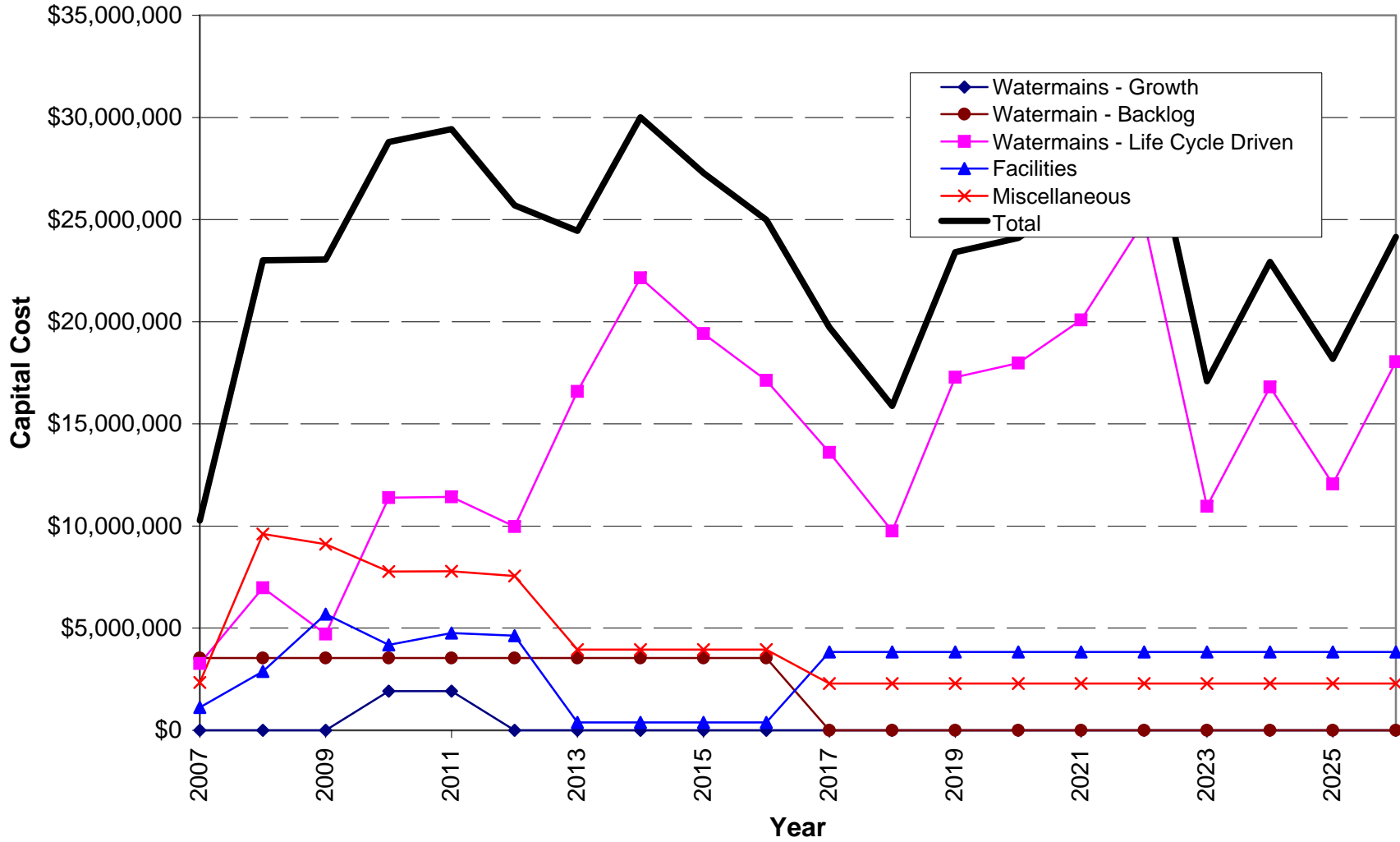
DATE: August 2007

Figure Ex 3

**Figure Ex 4: Capital Forecast - WUC Facilities**



**Figure Ex 5: Capital Forecast - 20-Year Annual Capital Costs**



Funding of the capital program was considered by 2 options (i.e. a low debt option and a high debt option).

Option 1 - Low Debt

<b>Capital Financing</b>	<b>Total</b>
Provincial/Federal Grants	-
Development Charges	-
Non-Growth Related Debenture Requirements	3,945,900
Growth Related Debenture Requirements	30,365,250
Operating Contributions	-
Transfer from Depreciation Reserve Fund	53,906,500
Transfer from Main Replacement Reserve Levy	168,441,300
Reserves and Reserve Funds	55,805,250
<b>Total Capital Financing</b>	<b>312,464,200</b>

Option 2 - High Debt

<b>Capital Financing</b>	<b>Total</b>
Provincial/Federal Grants	-
Development Charges	-
Non-Growth Related Debenture Requirements	76,535,700
Growth Related Debenture Requirements	30,365,250
Operating Contributions	-
Transfer from Depreciation Reserve Fund	37,600,000
Transfer from Main Replacement Reserve Levy	154,161,850
Reserves and Reserve Funds	13,801,400
<b>Total Capital Financing</b>	<b>312,464,200</b>

As noted above, development charges will assist in funding some of the capital program. Presently the charge for a single-detached unit is \$574. Based on the \$81 million in growth-related servicing needs identified in Stantec's 2045 model evaluation, it is expected that this charge should increase to approximately \$1,800. The Commission and City may wish to consider increasing the DC, otherwise there will be a long term impact on water rates.

The total (replacement) value of the WUC's watermain and facilities infrastructure is \$831 million (2007\$). The 10 year capital program provides for the replacement of \$195.6 million (uninflated) of existing assets. The replacement of the remaining \$635.2 million has been considered within the long term rates as this allows the Commission to attain full cost pricing over time.

The operating expenditures have been forecast over time also. Individual expenditure components have been reviewed with staff and have been inflated by between 2% and 5% annually.

Water rates have been forecast over the 10 year period. As recommended by the Commission, the monthly fixed base charge will increase but the volume rate will be held at present rates. The Watermain Replacement levy (fixed monthly and volume rate) has been increased from 13% to 45% of the monthly base charge and volume rates as of August 1, 2007. The forecast of charges for future years is based on this same structure. It is recommended that the summer levy be discontinued commencing 2008. The calculated rates are provided below based on the two capital financing options discussed earlier (for a 5/8" customer):

	2006	2007 (Jan 1 - Jul 31)	2007 (Aug 1 - Dec 31)	2008	2009	2010	2011	2012	2013	2014	2015	2016
<b>Option 1 - Low Debt</b>												
Monthly Base Charge	9.63	9.63	16.84	16.62	16.67	16.73	16.79	16.55	16.04	16.23	16.42	16.62
Monthly Main Replacement Levy	1.25	1.25	7.58	7.48	7.50	7.53	7.56	7.45	7.22	7.30	7.39	7.48
<b>Total Monthly Fixed Charges</b>	<b>10.88</b>	<b>10.88</b>	<b>24.42</b>	<b>24.10</b>	<b>24.18</b>	<b>24.26</b>	<b>24.35</b>	<b>24.00</b>	<b>23.26</b>	<b>23.54</b>	<b>23.81</b>	<b>24.10</b>
Volume Rate	0.266	0.266	0.266	0.358	0.426	0.469	0.469	0.469	0.471	0.471	0.471	0.471
Main Replacement Levy Volume Rate	0.035	0.035	0.120	0.161	0.192	0.211	0.211	0.211	0.212	0.212	0.212	0.212
<b>Total Volume Rate</b>	<b>0.301</b>	<b>0.301</b>	<b>0.386</b>	<b>0.520</b>	<b>0.617</b>	<b>0.680</b>	<b>0.681</b>	<b>0.681</b>	<b>0.683</b>	<b>0.683</b>	<b>0.683</b>	<b>0.683</b>

	2006	2007 (Jan 1 - Jul 31)	2007 (Aug 1 - Dec 31)	2008	2009	2010	2011	2012	2013	2014	2015	2016
<b>Option 2 - High Debt</b>												
Monthly Base Charge	9.63	9.63	16.84	16.62	16.67	16.73	16.79	16.55	16.04	16.23	16.42	16.62
Monthly Main Replacement Levy	1.25	1.25	7.58	7.48	7.50	7.53	7.56	7.45	7.22	7.30	7.39	7.48
<b>Total Monthly Fixed Charges</b>	<b>10.88</b>	<b>10.88</b>	<b>24.42</b>	<b>24.10</b>	<b>24.18</b>	<b>24.26</b>	<b>24.35</b>	<b>24.00</b>	<b>23.26</b>	<b>23.54</b>	<b>23.81</b>	<b>24.10</b>
Volume Rate	0.266	0.266	0.266	0.284	0.319	0.357	0.368	0.379	0.408	0.450	0.463	0.477
Main Replacement Levy Volume Rate	0.035	0.035	0.120	0.128	0.144	0.161	0.166	0.171	0.183	0.203	0.208	0.215
<b>Total Volume Rate</b>	<b>0.301</b>	<b>0.301</b>	<b>0.386</b>	<b>0.412</b>	<b>0.463</b>	<b>0.518</b>	<b>0.534</b>	<b>0.550</b>	<b>0.591</b>	<b>0.653</b>	<b>0.671</b>	<b>0.692</b>

Based on the rates presented above, the annual charges for a residential customer (based on an annual consumption of 294m<sup>3</sup> and a 5/8" meter) are provided below:

	2006	2007 (Jan 1 - Jul 31)	2007 (Aug 1 - Dec 31)	Total 2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
<b>Option 1 - Low Debt</b>													
Annual Base Charge	115.56	67.41	84.20	151.61	199.46	200.07	200.76	201.54	198.61	192.54	194.78	197.08	199.43
Annual Main Replacement Levy	15.02	8.76	37.89	46.65	89.76	90.03	90.34	90.69	89.38	86.64	87.65	88.68	89.74
<b>Total Annual Fixed Charges</b>	<b>130.58</b>	<b>76.17</b>	<b>122.09</b>	<b>198.26</b>	<b>289.22</b>	<b>290.10</b>	<b>291.11</b>	<b>292.23</b>	<b>287.99</b>	<b>279.18</b>	<b>282.43</b>	<b>285.76</b>	<b>289.18</b>
Volume Charge	78.19	45.61	32.58	78.19	105.34	125.14	137.91	138.03	138.00	138.57	138.56	138.40	138.53
Main Replacement Levy Volume Charge	10.16	5.93	14.66	20.59	47.40	56.31	62.06	62.11	62.10	62.35	62.35	62.28	62.34
<b>Total Volume Charges</b>	<b>88.35</b>	<b>51.54</b>	<b>47.24</b>	<b>98.78</b>	<b>152.74</b>	<b>181.46</b>	<b>199.97</b>	<b>200.15</b>	<b>200.09</b>	<b>200.92</b>	<b>200.91</b>	<b>200.69</b>	<b>200.86</b>
<b>Total Annual Water Bill</b>	<b>218.93</b>	<b>127.71</b>	<b>169.33</b>	<b>297.04</b>	<b>441.96</b>	<b>471.56</b>	<b>491.07</b>	<b>492.37</b>	<b>488.08</b>	<b>480.10</b>	<b>483.34</b>	<b>486.45</b>	<b>490.04</b>

	2006	2007 (Jan 1 - Jul 31)	2007 (Aug 1 - Dec 31)	Total 2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
<b>Option 2 - High Debt</b>													
Annual Base Charge	115.56	67.41	84.20	151.61	199.46	200.07	200.76	201.54	198.61	192.54	194.78	197.08	199.43
Annual Main Replacement Levy	15.02	8.76	37.89	46.65	89.76	90.03	90.34	90.69	89.38	86.64	87.65	88.68	89.74
<b>Total Annual Fixed Charges</b>	<b>130.58</b>	<b>76.17</b>	<b>122.09</b>	<b>198.26</b>	<b>289.22</b>	<b>290.10</b>	<b>291.11</b>	<b>292.23</b>	<b>287.99</b>	<b>279.18</b>	<b>282.43</b>	<b>285.76</b>	<b>289.18</b>
Volume Charge	78.19	45.61	32.58	78.19	83.58	93.83	105.08	108.32	111.47	119.87	132.32	136.05	140.23
Main Replacement Levy Volume Charge	10.16	5.93	14.66	20.59	37.61	42.22	47.29	48.75	50.16	53.94	59.54	61.22	63.11
<b>Total Volume Charges</b>	<b>88.35</b>	<b>51.54</b>	<b>47.24</b>	<b>98.78</b>	<b>121.18</b>	<b>136.05</b>	<b>152.37</b>	<b>157.07</b>	<b>161.63</b>	<b>173.81</b>	<b>191.87</b>	<b>197.27</b>	<b>203.34</b>
<b>Total Annual Water Bill</b>	<b>218.93</b>	<b>127.71</b>	<b>169.33</b>	<b>297.04</b>	<b>410.41</b>	<b>426.15</b>	<b>443.48</b>	<b>449.30</b>	<b>449.62</b>	<b>452.99</b>	<b>474.29</b>	<b>483.03</b>	<b>492.52</b>

Based on the August 1, 2007 rates, the following table provides the average cost of various uses for water in a home. As a comparison, this table also provides the cost for these uses based on using bottled water (based on a purchase price of \$1.00 for a 500ml bottle).

Description of Water Use	Water Used		Cost with Municipal Water <sup>1</sup>	Cost with Bottled Water <sup>2</sup>
	Litres	(m <sup>3</sup> )	(\$1.38 per m <sup>3</sup> )	(\$2,000 per m <sup>3</sup> )
Flush Toilet - Modern Low Flow	6	0.006	\$ 0.0083	\$ 12.00
Flush Toilet - Older	13	0.013	\$ 0.0179	\$ 26.00
5 minute shower with low flow shower head	28.5	0.0285	\$ 0.0393	\$ 57.00
5 minute shower with regular shower head	94.5	0.0945	\$ 0.1304	\$ 189.00
Bath tub	150	0.15	\$ 0.2070	\$ 300.00
Conventional washing machine	180	0.18	\$ 0.2484	\$ 360.00
Running faucet 1 minute to get cold	9.5	0.0095	\$ 0.0131	\$ 19.00
Watering lawn for 1 hour	1320	1.32	\$ 1.8216	\$ 2,640.00

<sup>1</sup> August 1, 2007 rates - \$406 annual water bill based on 294 m<sup>3</sup> of water (no seasonal levy included)

<sup>2</sup> Assumes a 500 ml bottle of water at \$1.00

The following tables provide a comparison of an average annual residential water bill across Ontario (based on size of municipality and location).

Annual Cost of Water by Area  
(Based on 294 m<sup>3</sup> annual consumption)

2007				
Area	# of Municipalities	Low	High	Median
Central	34	\$168	\$1,109	\$385
South East	42	180	852	340
South West	56	116	890	392
North East	32	146	745	353
North West	9	334	750	433
Total	173	-	-	-

Annual Cost of Water by Municipality Size  
(Based on 294 m<sup>3</sup> annual consumption)

2007				
Size	# of Municipalities	Low	High	Median
< 5,000	39	\$146	\$1,109	\$447
5,000 - 10,000	41	180	858	397
10,000 - 50,000	63	147	641	358
50,000 - 100,000	9	250	636	388
100,000 +	21	116	524	292
Total	173	-	-	-