Financing of Municipal Waterworks: Analysis and Case Studies

A paper submitted to Part II of the O'Connor Inquiry

Association of Municipalities of Ontario, Municipal Engineers Association, and the Ontario Good Roads Association

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Notwithstanding this assistance, all opinions expressed in this report are those of the Association of Municipalities of Ontario, the Municipal Engineers Association and the Ontario Good Roads Association.

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1. INTRODUCTION

Important questions are currently being raised about the need for an increased level of sustained investment in Ontario's public drinking water network. As municipalities are the owners and operators of these public drinking water systems, any discussion of ways to increase and sustain such investment must be considered within the context of municipal financing practices and capacity.

Much of the capital intensive drinking water treatment and distribution network, worth between $30 billion to $50 billion[1] (OSWCA 2001; Powell, 2000), has been financed over the last 50 years through a cost-sharing relationship between municipalities and the Ontario Government. The degree of support from the Province has varied depending on its own fiscal capacity and policy priorities.

Now the nature of that municipal-provincial financial relationship that has developed and has helped to sustain this sophisticated infrastructure network is changing. These changes are consistent with the fundamental shift in the provincial-municipal relationship. In an effort to disentangle provincial and municipal roles, responsibilities, and financial involvement, a clearer separation of financial responsibilities is emerging.

In many cases, efforts towards disentangling provincial and municipal responsibilities have been successful. However, one of the negative effects of these changes has been that the proportion of public expenditures for social and health services that must now be paid through after-tax property taxes and user fees has generally increased. This increase, as well as changes in taxation policy, pose an increasing risk to tax payers, particularly residential ones.

It is within this broader fiscal context that the provincial government is reducing grants for drinking water infrastructure, and encouraging municipalities to move to a full cost recovery system. While it has multiple benefits, such as improving financial planning and promoting greater water conservation, full cost recovery also has significant implications, the most obvious being a significant increase in water rates throughout the province. Some municipalities, with many water customers over whom to spread the costs, will be able to absorb these increases. Those with fewer customers may find the increase in costs prohibitively expensive.

With the increasing pressures for public expenditure on services to be financed through the property tax base, a dramatic increase in user fees is all the more difficult for households to absorb. Any changes to the financial relationship over drinking water infrastructure must be based on sound analysis to determine whether all municipalities, large and small, can sustainably finance their systems into the future.

[1] The Ontario Sewer and Watermain Construction Association has estimated that the combined value of Ontario's water and sewage infrastructure is approximately $60 billion. Assuming that half of this is water infrastructure, then it would be worth $30 billion. George Powell has estimated that the combined assets may have a replacement value of up to $100 billion. Half of this would be $50 billion.

In chapter 2, the broader content of municipal finance is explained. The basics of municipal finance management are outlined, and the significant changes brought about by the Provincial Local Services Realignment process are explored.

Chapter 3 provides background on the theory and practice of drinking water infrastructure financing. The specific characteristics of infrastructure financing are explored and the sources of revenue for drinking water system financing are itemized. The chapter also traces trends in municipal investment in infrastructure and provincial-municipal cost sharing and discusses estimates of the necessary level of investment into the future.

In chapter 4, four case studies of municipal financing of water systems are presented. The case studies, prepared by PricewaterhouseCoopers, serve as local, practical examples of the different ways in which municipalities finance their systems, including the degree to which they rely on user fees, grants, and other sources of revenue to pay for infrastructure renewal. The chapter ends with a thumbnail sketch of the financial sustainability of these four systems, with and without grants.

Chapter 5 presents a number of options to strengthen the capacity of municipalities to finance their water systems. Three complementary approaches are explored, including cost-cutting measures, reflecting the true cost of water, and providing appropriate finance management tools to municipalities.

Chapter 6 identifies and provides comment on some of the main issues raised in the paper.

2. A GUIDE TO MUNICIPAL FINANCE

2.1 Introduction

During the period 1989 to 2001, the municipal order of government in Ontario has faced some of the most dramatic, all encompassing changes since the introduction of the Baldwin Act of 1849. These changes have affected every aspect of municipal government, some welcomed, and others not. To name some of the most sweeping changes:

- long standing elements of the provincial -municipal financial relationship have been changed, most recently with the elimination of conditional and unconditional grants and the introduction of a form of equalization transfers, known as the Community Reinvestment Fund;
- the number and range of functions that municipalities must deliver and finance has expanded significantly;
- the valuation system for the assessment base, which determines every municipality's revenue source, has been overhauled;
- municipal discretion over property tax rates has been marginalized by provincial legislation that caps rate increases for Industrial, Commercial and Institutional (ICI) and Multi-residential properties;
- the number of municipalities and the number of politicians have been reduced by 45% and 40% respectively through amalgamations, and creating fewer but larger municipalities. The administration of some municipalities has been fundamentally changed in areas where two-tiered municipalities have been amalgamated into single-tier cities, and rural and small urban municipalities have merged.

With a change in three successive provincial governments within ten years, municipal governments have had to implement three different sets of priorities and programs, each with a fundamentally different approach to recasting the provincial-municipal relationship. The degree and speed of change, particularly over the last six years, has been extremely challenging for municipal governments. It has required complex and detailed change management, in labour relations, in finance management, and in administrative reorganization. At the same time, the wider economic climate has also been quite extreme, beginning with the long recession of the first half of the 1990s, to the boom of the last years of the decade, through to the current economic slowdown. The combination of these events and circumstances has created significant financial pressures, to which some municipalities are still adapting.

This whirlwind of 'reform' is taking place within the context of fairly restrictive financial circumstances within which municipalities must operate. Municipalities do not have the ability to deficit finance, like their provincial[2] and federal counterparts. Municipalities have only one principal revenue source, the property tax. And a large share of municipal expenditures is non-discretionary, prescribed by the province or special purpose bodies

[2] Recently, the Provincial Government limited its fiscal discretion by passing the *Balanced Budget Act,* which, as of 2001, requires that the Government plan for a balanced budget. In the event of a deficit budget, Cabinet members are penalized with a salary cut.

such as Police Service Boards and Boards of Health. As provincial income-redistribution programs are downloaded to municipalities, and both federal and provincial service standards are made more stringent, the somewhat anachronistic, restrictive revenue source, the property tax, is coming under severe strain.

This section provides an outline of the 'basics' of municipal governance and finance, and an overview of public policy changes affecting municipalities over the last several years.

2.2 Municipal Governance And Finance: The Basics

2.2.1 The Current Municipal Structure

To begin to understand how municipal finance works, a basic knowledge of the municipal governance structure in Ontario is needed.

There are two main municipal structures in Ontario today, 2-tier and 1-tier. In Southern and mid-Ontario, there are two-tiered municipalities, with lower-tier municipalities organised into larger upper-tier counties or regions, with each tier designated specific responsibilities through numerous pieces of legislation. As of January 1, 2001, there are 24 counties[3] and 6 regions in the Province. As well there are large single-tier municipalities such as Hamilton, Haldimand, Norfolk, Ottawa, Sudbury, and Toronto. Chatham-Kent, a smaller 1-tier separated city, is somewhat of an exception. These cities are responsible for all municipal responsibilities.

In Northern Ontario, while municipalities are single-tier, they are located in 11 areas designated as districts. These districts have no government function (with the exception of the District of Muskoka, which is, for all intents and purposes, an upper-tier structure). In order to address area-wide functions that spill over local boundaries, the Province has formed District Social Service Administration Boards (DSSABs) that are responsible for defined functions such as social services and social housing. DSSABs apportion and levy their budget needs from municipalities in their area, but have no taxation authority.

The two-tiered county system was created by the Baldwin Act of 1849. The purpose of the two-tiered county structure was to provide a limited range of services over large, rural areas and to distribute the costs. Over time, the range of services has expanded so that today responsibilities include such things as highways, homes for the aged and other community services, welfare, economic development and planning functions, museum and libraries management, and ambulance services. Where there is a separated municipality within a county, it may be designated by the Province as the consolidated municipal services manager (CMSM) for some services. For example, Middlesex County is designated the CMSM for the delivery of ambulance service to the County and the City of London. The City is designated as the delivery body for social assistance to the County and the City.

[3] This number includes the restructured county of Oxford. It does not include counties that have become single-tier due to amalgamations, such as Victoria County (now called the City of Kawartha Lakes), Chatham-Kent, and the Counties of Norfolk, Haldimand, and Prince Edward.

In twelve areas in Ontario, the county structure was replaced in the 1960s-70s with a regional two-tiered structure. Initially, the regions were somewhat stronger and were responsible for more services than counties. They also encompassed both rural and larger urban municipalities. Today, due to amalgamations, the number of regions has been reduced to six, including Durham, Halton, Niagara, Peel, Waterloo, and York. These regions are typically responsible for policing, welfare assistance, child care, arterial roads, homes for the aged, area wide planning, environmental services (landfill and waste management), etc. The responsibility for transit, water and sewer varies. In some regions these are upper-tier responsibilities and in other regions they are left as lower tier functions. Matters such as fire protection, local roads, culture and recreation, parks, planning and zoning, building inspection, animal control and the like are functions of the lower-tier.

In terms of the financial relationship between upper and lower tiers, counties and regions set an upper tier tax rate, which is then collected by the lower tier municipalities and transferred to the upper tier. All upper tier revenue therefore comes from property taxes collected by lower tier municipalities within each county or region, in proportion to their share of the total taxable assessment of the regional or county area.

Many lower-tier, predominately rural municipalities find a large portion of their budget dedicated to public works, fire and community facilities, while the typical upper-tier or large single-tier municipalities finds a large portion of their budget dedicated to social services, social housing, ambulance, health services and policing.
Most lower-tier and single-tier municipal councils are comprised of a Mayor or Reeve plus councillors, with the size of council varying in relationship to the size (both geographic and population) of the municipality. The size may range from 4 councillors in the smallest municipalities, to 20-40 in the largest municipalities.

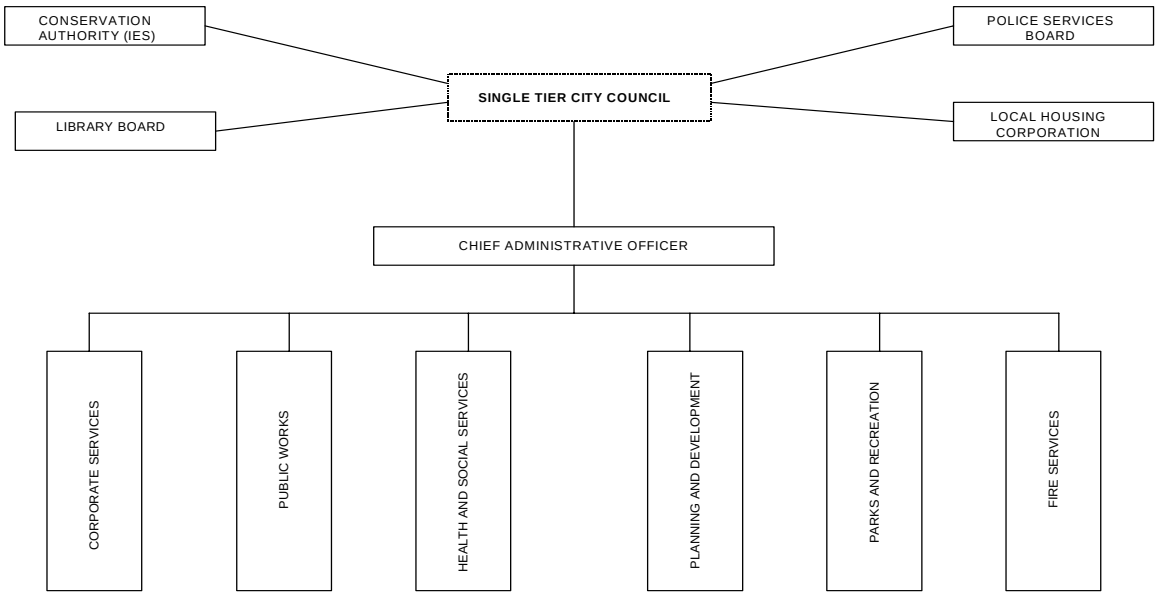
Upper tier councils are usually comprised of the heads of council and one other member from each of the lower-tier municipalities. In counties, the head of County Council is elected from amongst the members of County Council. In the regions, several of the Chairpersons are directly elected to the position and in some regions a portion of the upper-tier council is directly elected (not members of the local council) to the upper-tier.

A typical upper-tier municipality will have a Chief Administrative Officer supported by Commissioners/Directors/Managers of Corporate Services, Planning & Development, Public Works, Health & Social Services, Library Services and a Police Chief. A typical mid-sized lower-tier municipality will have a Chief Administrative Officer supported by Commissioners/Directors/Managers of Corporate Services, Planning Services, Public Works, Parks & Recreation and a Fire Chief (perhaps a Police Chief if policing is a lower-tier function). Smaller lower-tier municipalities (most Townships within County systems) often have a Clerk-Administrator supported by a Treasurer, a Planning Director, a Public Works Manager, a Chief Building Official and a Manager of Community Services.

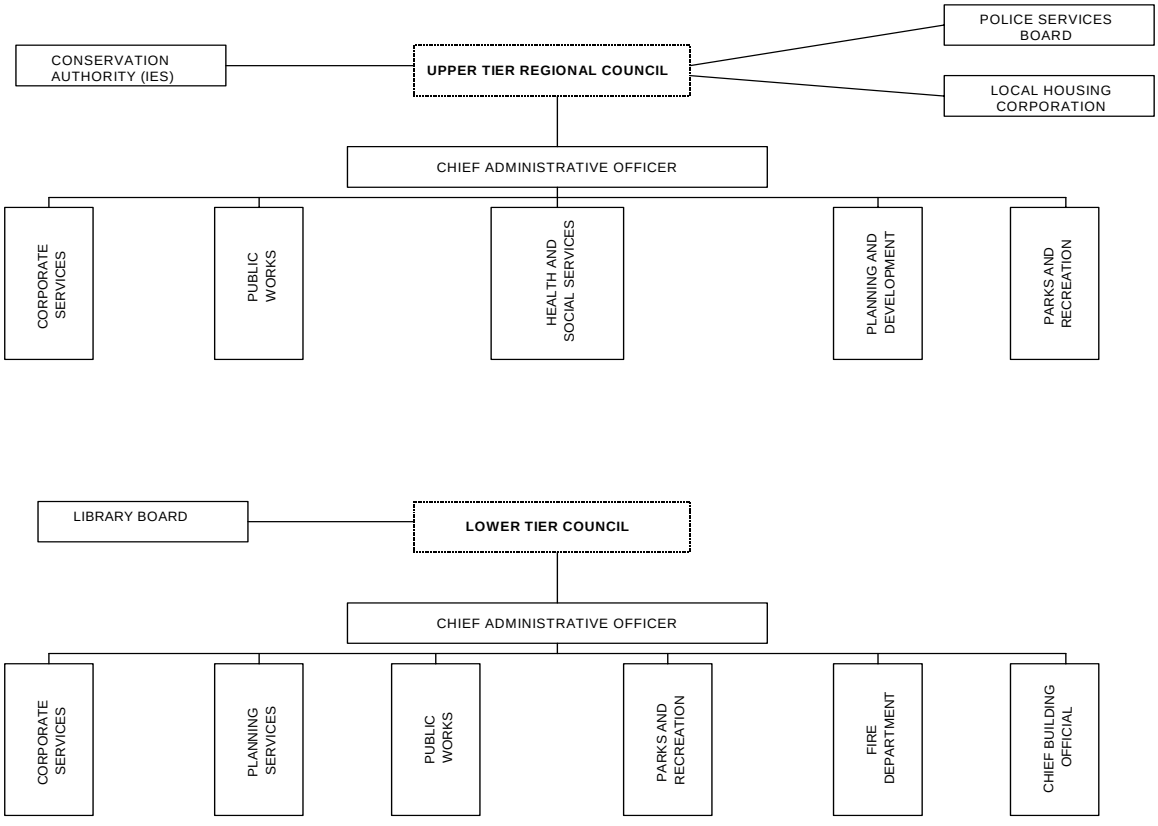
A typical single-tier municipality will have a Chief Administrative Officer supported by Commissioners/Directors/Managers of Corporate Services, Planning & Development, Public Works, Health & Social Services, Library Services, Parks & Recreation and a Police Chief and Fire Chief.

Figure 1: Municipal Organisational Charts

TYPICAL ORGANISATION CHART FOR SINGLE TIER CITY



TYPICAL ORGANISATION CHART FOR TWO TIER MUNICIPALITY



Special Purpose Bodies

In addition to the two-tiered governance structure, responsibility for some functions is separated out from municipalities, and delegated to special purpose bodies. Ontario is somewhat unique with the number of extra-municipal special purpose bodies (SPBs).

These agencies, boards and commissions are usually mandatory bodies that are established by provincial statute, although some are created at the discretion of the municipal council. The most familiar special purpose bodies include public utilities commissions, police boards, health boards, community centre boards, and conservation authorities. While they operate at the local level, some operate beyond a single municipality's borders. They are not integrated into the municipal government, and so municipal councils have little or no authority over them. However, SPBs are funded through municipal revenues.

As semi-autonomous bodies, many decisions made by SPBs require no vetting by municipal councils, even though the decisions may have a direct impact on municipal business and the municipal budget. Some favour this relationship, as it 'depoliticizes' the activities of the SPB. However, this lack of council knowledge of, or input into, SPB decision-making can become problematic, particularly over the longer term. While a councillor may be an "ex-officio" member of SPB, there is no direct reporting relationship[4]. Since the SPB operates outside of the normal council sphere of influence, members of council may not be aware of whether longer term capital budget requirements of the SPB are being adequately addressed. However, this dynamic can work both ways. Some argue that some SPBs better manage assets over the long term, as they adopt more business-like management practices. Either way, the separation of SPB decision-making from council can at times create a disconnect in the operations of essential municipal functions and the potential for enhanced efficiencies.

The financial relationship between a municipal council and an SPB differs depending on the SPB. Some SPBs have partial or complete financial independence from council. This is the case for police commissions, health units and conservation authorities. This can create some tension between SPBs and municipal councils at budget time, as councils are asked to approve SPB budgets that are to be paid for through municipal tax revenue even though many items are beyond their control. This creates an 'accountability' gap for municipal councils who must justify their total budgets and level of taxation to property tax payers.

In addition, since the reach of many SPBs is inter-municipal, there is no exclusive relationship between the services provided by the SPB and the municipalities it serves. One council's attempt to change the budget of an SPB may be complicated if it requires the joint agreement of several councils. As a result, the SPB's budget often becomes just another requisition rather than an item to be considered when competing priorities are being discussed by a municipality's council.

[4] *Bill 46, Public Sector Accountability Act*, announced in the 2001 Budget Speech, may require additional performance measurement and financial reporting by all publicly funded organizations including special purpose bodies.

The different ways in which municipal councils deal with fire and police budgets illustrates the difference between line-items within a municipal budget, and SPBs' budgets. When council is dealing with the budget of an internal department like the Fire Department budget, the submission becomes part of the priority setting process of council' budget deliberations. On the other hand, if council questions the budget submitted by the Police Services Board, an SPB, it may be interpreted as challenging the judgement of the Board, and the situation may become adversarial. There is little opportunity to consider the budget in relation to other pressures such as fire, ambulance, social housing, transit and the like. In the case of the Police Services Board, it has the ability to request the Ontario Civilian Commission on Policing Services to review the budget. A recent newspaper headline drew attention to this situation: 'Police staffing becomes hot budget issue: Services board chairman might go over heads of city council' (Kingston Whig Standard, February 3, 2001).

In theory, municipal appointees to SPB boards should be able to affect their budget process and decision-making. In practice, however, they tend to be constrained by the detailed, prescriptive nature of the SPB legislation, regulations and guidelines issued by provincial ministries.

Municipal Amalgamations

In the late 1980's, the Liberal Government embarked on a review the 140-year-old county structure. It released a report entitled 'Towards an Ideal County'. During this period, many counties voluntarily examined their structure. But only one, Simcoe County took steps to significantly change its structure. Then, soon after the current government took office in 1995, it outlined its expectations for dramatic change in the structure of municipal government and in the very nature of the provincial-municipal relationship. The process began with a sweeping plan to restructure municipalities throughout Ontario. At the same time, it significantly shifted and increased municipal responsibilities and altered the municipal taxation regime.

Municipal amalgamations affected both the number of municipalities and their governance structure. The Provincial Government amended the *Municipal Act* (Section 25) in 1995 to provide for municipal "restructuring". The Province enunciated five principles to be considered when developing restructuring proposals:

- Less Government: fewer municipalities, fewer elected representatives and reduced spending
- Effective representation system: accessible, accountable and of a size that permits efficient priority-setting
- Best value for taxpayer's dollar: efficient service delivery, reduced duplication and overlap and clear delineation of responsibilities between local government bodies
- Ability to provide municipal services from municipal resources: local self reliance to finance municipal services, ability to retain and attract highly qualified staff
- Supportive environment for job creation, investment and economic growth: streamlined, simplified government, high quality services at the lowest possible cost.

The amendments to the *Municipal Act* addressed restructuring within the County structures in southern Ontario and among the numerous organized and unorganized townships in northern Ontario. These amalgamations resulted in a dramatic reduction in the number of municipalities. During the period July 1996 to January 2001, the number of municipalities has been reduced from 825 to 447 and the number of elected officials from 4586 to 2804.
The Province undertook regional government restructuring with the introduction of specific legislation[5]. This resulted in the restructured Metropolitan Toronto into the City of Toronto (January 1, 1998) and the Regions of Haldimand-Norfolk, Hamilton-Wentworth, Ottawa-Carleton and Sudbury (January 1, 2001) into 6 single-tier municipalities. These legislative decisions, which followed independent studies or reports from advisors, reduced the number of municipalities by approximately 50 and the number of elected officials by 300.

The amalgamation of the Town of Walkerton into the Municipality of Brockton is an example of the restructuring that has taken place across the Province. Within the County of Bruce, 28 former lower-tier municipalities became 8 within the upper-tier county system, while the number of politicians was reduced from 132 to 72. Brockton was formed from an amalgamation of the Township of Brant, the Township of Greenock and the Town of Walkerton, which resulted in a reduction of elected representatives, from 17 serving three communities to 7 serving one.

The provincial government's objective of reducing the number of elected municipal representatives and municipalities was not accompanied by a similar objective to reduce the number of special purpose bodies. Many municipalities that voluntarily restructured made proposals for reductions in the number of special purpose bodies (e.g. Boards of Health) in order to achieve greater accountability and integration of functions. Restructured counties called for full integration of their Boards of Health with the upper-tier administration similar to the situation in many regions, but this has not occurred.

Restructuring did result in fewer municipal governments and larger municipalities and the development of more sophisticated municipal operations. However, whether savings are directly attributable to amalgamation is difficult to document in light of all the other shifts in services and standards and taxation policy changes.

2.2.2 The Basics of Municipal Finance

Municipal finance management is fundamentally different from the financial management of either the federal or provincial government[6]. As a 'creature of the province' each municipality operates within tight provincial rules. The rules ensure that municipalities do not overextend themselves financially, by limiting their revenue to one principle source, property taxes, and by prohibiting deficit financing. These rules also ensure that municipal councils are directly accountable to the business and residential property tax payers, whose taxes pay for local services.

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[5] See City of Greater Sudbury Act, 1999; City of Hamilton Act, 1999; City of Ottawa Act, 1999, City of Toronto Act, 1997; Town of Haldimand Act, 1999; Town of Norfolk Act, 1999; Fewer Municipal Politicians Act, 1999.
[6] See footnote #2.

With strict limits on financial capacity, and direct accountability, municipal finance managers could be characterized as the most fiscally conservative amongst the three levels of government.

Municipal Revenue Sources

Revenue sources for the municipal order of government are limited to: (1) taxation on property assessment, (2) development charges, (3) user fees, (4) license fees, (5) fines and (6) transfers from the Provincial and Federal governments.

The property tax system, on average, produces approximately 70% of municipal own-source revenue. Property tax is based on the rates established for different classes of property (e.g. single-family residential, multi-residential, commercial, industrial, institutional, farmland). These rates are usually established by the municipal council, but must be within the provincially set range of 'fairness', and applied to the value of all real property as assessed by the Ontario Property Assessment Corporation (OPAC). Real property includes all private households, businesses, farmland, etc. but excludes tax-exempt properties such as federal and provincial lands, properties owned by school boards, religious institutions, charitable or non-profit organisations, and land held in trust for a First Nations body or band.

Reliance on the assessment base as the major source of municipal revenue results in very different levels of revenue for municipalities throughout Ontario, depending on the ratio of property classes, the rate of municipal growth, and the assessment value of properties.

Clearly, those municipalities with a growing tax base find it easier to deal with new challenges and new costs than those with a static or shrinking tax base.

Traditionally, property taxes were paid by households and businesses to cover the cost of those municipal services provided to their properties. These include garbage collection, water supply and sewage management services, municipal road construction and maintenance, fire protection, parks and recreation, library and community services, among others. At the same time, school boards would set their budgets and taxes, which were collected by municipalities as a line on the property tax bill. These education taxes rose significantly in the late 1980s and early 1990s.

The make-up of programs and services that are paid for through property taxes changed significantly in the latter half of the 1990s, due to Local Services Realignment and further provincial downloading to municipalities. As a result, the revenue from property tax is funding more human services, such as open-ended income redistribution programs providing social assistance, social housing, child care and public health. At the same time, a portion of the residential education taxes has been assumed by the Province. However, where this created 'tax room', it has been more than filled by the above mentioned income redistribution programs. Transferred programs and services, limited revenue streams and provincially imposed efficiency targets are putting a great strain on property taxes and property tax rates.

This new financial rationalization of provincial and municipal programs and services runs counter to conventional taxation policy theory. In a recent report for the C.D. Howe Institute, taxation expert Professor Harry Kitchen notes,

> *"The basic idea is simple: those who benefit from services should pay for them. Thus a municipality's taxes should fund the range of local services enjoyed by its own residents, but not redistribution of income or benefits that spill over onto neighbouring communities, commuters or visitors*." (Kitchen, 2000).

The shift towards paying for additional income redistribution programs is of particular concern given the inflexible nature of property tax revenue during changing economic times. In times of economic recession, municipal property tax revenue is not flexible enough to absorb greater surges in demand for welfare and other income-redistribution payments. In the opposite circumstances, during good economic times, municipal tax revenue changes very little, as it is not linked to consumption or income in the way that provincial and federal sales or income taxes are. So while Canada and Ontario saw their tax revenues swell by 53 percent and 45 percent respectively since 1992, (Lorinc, 2001), municipal revenues have experienced single-digit increases over the same period.

Property assessment is the foundation on which municipal taxation is based. For years, Ontario municipalities saw little change in their revenues as the assessment system undervalued properties. In 1997, the Provincial Government introduced Current Value Assessment, in an effort to have the assessment of properties better reflect their current market value. The ongoing function of property assessment has been transferred to a new Ontario Property Assessment Corporation (OPAC), a municipally-funded body created by the Province. Two rounds of current value assessment have been released, for 1998, and again for 2001. By 2006, taxes are to be based on an average of the actual assessment from the preceding three years.

In addition to Current Value Assessment, the Provincial Government has mandated other policy changes to the municipal tax system, which are having an enormous impact on the ability of municipalities to control tax rates while raising needed revenues.

Perhaps most significantly, the discretion of municipalities to establish tax ratios has been limited. Tax ratios determine the tax rate relationship between the various classes of property assessment (e.g. residential, commercial, industrial, farm land, etc.) and they must fall within provincially established ranges. As well, the Province passed what is known as the '10/5/5' legislation (*Bill 79*) in 1997, which imposed a 10%-5%-5% ceiling (2.5/2.5/2.5 in Toronto) for tax increases on industrial/commercial and multi-residential properties for years 1998-1999-2000 respectively. The government recently announced that it would continue to cap municipal tax increases due to reassessment. *Bill 140* imposes a 5% limit on tax increases on these same property classes from 2001 on.[7]

[7] See *The Fairness for Property Taxpayers Act, 1998,* and *Continued Protection for Property Taxpayers Act, 2000*.

The capping of property taxes for industrial, commercial and multi-residential properties means that any new dollars to be raised through taxation must be concentrated on single-family residential and farm properties only. If municipalities need to raise added revenues, it will largely fall on these two property classes.

In addition, the property tax has been compromised as a revenue source in rural Ontario. Taxation legislation limits property tax on farmland to 25% of its value as a means of replacing the former provincial income-tax-funded Farm Tax Rebate. Effectively, payment of Farm Rebate financing was transferred from the Province to the municipal tax base. Consequently, rural municipalities with a small commercial and industrial business base within their community are further challenged by the loss of 75% of the rural assessment base in order to provide support to the farm community.

Direct transfers from the provincial and federal governments, over the years, have become very limited. Provincial transfers were reduced over the last 8 years and the Municipal Support Grant was eliminated with the introduction of the local service realignment (LSR)/community reinvestment fund (CRF). The various infrastructure programs have been of a set duration with yearly allocations and provincially and federally determined criteria.

Line ministry capital funding programs have been consolidated into a crown agency called SuperBuild. In the recent past and with very few exceptions (i.e. recent water front assistance for Toronto) the Federal government capital transfers have been limited to its 1/3 portion of the federal/provincial/municipal infrastructure program(s) or through regional development programs. It has been estimated that Ontario municipalities absorbed over $1.7 B in provincial transfer payment cuts between 1993 and 1998 in response to the Social Contract, the Expenditure Control Plan, the 1995/96 Balance Budget Plan and Local Services Realignment in 1998.

User fees can be used to pay for the cost of specific services. In addition to partial or full cost recovery for hydro, water and sewage services, user fees are also set at lower than cost rates to provide access to recreational activities and public transit operations to the public and low-income residents in particular. The application of user fees are limited to only a few services, as user fees can only be collected effectively where there is a captive market. User fees cannot be used to raise additional revenue beyond the actual cost of a service.

Development charges (DCs) contribute to partial cost recovery for capital expenditures associated with municipal growth. The Development Charges Act allows municipalities to levy a charge from developers for growth related capital costs, (e.g. extensions of water and sewage connections). However, legislative changes (*Development Charges Act, 1997)* limited the scope of services for which municipalities may impose DCs. The previous legislation covered services designated in a development charges by-law. The new Act excludes cultural or entertainment facilities, hospitals, waste management services, even though these are often among the attributes that new home-owners and new business enterprises are wanting in a community. Like user fees, DCs can only apply to the costs associated with a specific development activity. They cannot be used to raise additional revenue. DCs work well for high growth areas.

However, municipalities with less growth are reluctant to introduce full recovery DCs, or any DCs at all, as they are concerned that the charges will have a negative impact on their ability to attract growth. As a result, there are many areas of the province where DCs have not been introduced.

The revenue from **fines and license fees** is limited. Fines are restricted to traffic violations, parking violations and violations of other municipal by-laws as collected through an enforcement program, including the courts. In terms of license fees, existing legislation clarifies that the municipal order of government is expected to establish license fees for a limited number of operations. Licence fees must reflect 'reasonable cost', and must not be used to generate discretionary income[8].

The Budget Process

Having raised the revenue, it is then up to municipal council to decide how to allocate it amongst many competing program and service priorities.

The municipal budget process is an annual process whereby municipal councillors decide on a municipality's current and capital expenditures. Decisions are based on recommendations from staff and/or special budget committees of council. The budget decision making process represents the prime opportunity for councillors to collectively prioritise the services, policies and programs of a municipality, based on a strategic plan or another priority-setting process, as well as legislatively mandated services and service levels.

The municipal budget process is a very public process and council is often faced with many competing requests. All budget deliberations are conducted at public meetings, and the ongoing deliberations are often closely followed and reported on by the local media. This is in contrast to the budget process of the two higher orders of government, which are conducted behind closed doors. While stakeholders can participate in legislative committee consultation sessions, the public is not privy to any cabinet deliberations as the budget is developed. The public's first view of the budget is on Budget Day, once it has already been finalized.

The budget is divided into current and capital components. The current budget allocates expenditures for the day-to-day operations of municipal departments and their activities, such as salaries, supplies, and other expenditures. The capital budget relates to major expenditures on physical assets, which have an economic life or provide a benefit over a number of years. This includes infrastructure, buildings, parks, vehicles, etc. The capital budget is usually accompanied by a multi-year capital forecast of expenditure items and sources of financing.

Municipal finance management fundamentally differs from that of federal or provincial finance management in that municipalities are prohibited from budgeting for a deficit in their current budget[9]. Any deficit in the operational budget one year becomes the first item of expense in the next year's budget. Municipalities are permitted to finance capital expenditures through debt, and then only to a limited extent, as is explained in the next

[8] See *The Savings and Restructuring Act, 1996*.
[9] See footnote #2.

section. This makes municipalities *defacto* fiscally conservative. In contrast, federal and provincial governments have historically relied on issuing long-term debt to expand their expenditures. Through painful expenditure control programs, both levels of government have balanced their budgets in recent years, but the legacy of deficit financing remains.

The fiscally conservative nature of municipal financing explains why municipalities find it very difficult to manage new 'in-year' expenditures, such as new provincial policies/programs or standards that impact their budgets part way through the year. If a new expenditure is not budgeted, it must be paid for from reserves, cuts to planned programs, or else it appears as the first expense in the following budget year, which may further limit the municipality's capacity to fund activities or conversely, necessitate a tax increase.

As mentioned earlier, many lower-tier, predominantly rural municipalities find a large portion of their budget dedicated to public works and administration, such as tax collection, while the typical upper-tier or large single-tier municipalities finds large portion of their budget dedicated to social services, social housing, ambulance, health services and policing.

For virtually all of the services just mentioned, the municipal council has little if any say in the impact of these costs on the municipal budget. Anywhere from 30 to 50% of the municipal budget is non-discretionary spending for services that are prescribed by law (eg. ambulance, public health, social housing), and standards for these and other services (eg. policing, homes for the aged) are regulated by the Province. If these standards are not met, the Province can exercise its enforcement powers. For example, if the local board of health does not meet the Mandatory Public Health Guidelines, the Province can appoint its medical officer of health as the Board of Health for the community. Budgets of special purpose bodies like the Police Services Boards and Conservation Authorities, must also be paid for through the municipal budget. In fact, once all provincial requirements, past municipal council decisions, debt payments and service standards are met, about 90% of annual expenditures are mandated and/or non-discretionary. Therefore, the amount of discretionary spending, that is the amount of spending over which council has absolute control year-to-year, is relatively small.

As previously mentioned, the Province took over responsibility for determining the Education Levy and removed 50% of this cost from property taxpayers through the Local Services Realignment process. Municipalities still serve as a collection agency for education purposes. Despite efforts to distinguish the education portion of the property tax bill from the municipal portion, by using different colours on the tax bill or designating one tax installment solely for provincial education purposes, the property owner still tends to see it as one tax bill.

A new, significant pressure on the municipal budget is the request to provide local hospital boards with 1/3 contribution to capital for new hospital construction[10]. In some municipalities, the corporate and other sectors are able to make significant contributions to offset the local 1/3 obligation. However, in more and more situations, the local hospital board is turning to the municipality, looking to the property tax base as one

[10] Hospital restructuring has seen the amalgamation and closure of hospitals as well as new centers as part of the rationalization of the provincial health care system.

relatively easy way of raising a significant portion of the required local contribution. Without a 1/3 contribution from the community, Hospital Boards are not able to benefit from the 2/3 provincial funding available. Municipal councils are finding it difficult to balance the importance of hospital facilities to their community and the implications of making such a long-term capital contribution.

Clearly this pressure from a service which is stated to be entirely the responsibility of the Federal and Provincial levels of government and which was not part of the local services realignment, along with the other pressures and requirements, further distorts council's ability to set priorities, and limits its ability to finance the functions that are a direct responsibility of Council while trying to set reasonable tax rates.

Finance Management Tools

In addition to direct revenue, municipalities can expand their financial capacity by employing different finance management strategies, such as debt financing (for capital expenditures only), and the accumulation of reserves.

In terms of debt financing for capital expenditures, municipalities must meet provincial rules designed to ensure that they do not become overextended financially. The debt that municipalities issue must only be related to a capital asset and both the interest and principal must be repaid, just like a home mortgage. There is no option to pay only the interest on the debt. Consequently municipalities must keep their debt repayments within manageable levels or their ability to finance day-to-day operating expenditures may be threatened.

Provincial legislation and regulation limit the debt capacity of the municipal order of government. Regulation 799/94 as amended by Regulation 155/99 limits the annual payments for debt and long-term financial obligations of any municipality to 25% of its own-purposes revenue sources (property taxation, user fees, etc.) The municipality cannot exceed this amount, a figure that is calculated and provided by the Province. Only the Ontario Municipal Board can approve exceeding this amount, which it has in the past and is being called on to do currently to help some municipalities finance their contribution for sewer and water works under SuperBuild's Ontario Small Town and Rural (OSTAR) Program.

Because of the added expense that debt repayment contributes to the current budget, and the concern that they may not have the additional revenue to make the repayments in the future, more and more municipalities are electing to finance long term capital expenditures out of current revenue. This costs current taxpayers proportionately more, but saves municipalities money in the long run. However, the combined pressures of freezing or reducing taxes and the increase in expenditures due to the downloading of income redistributive programs have constrained their ability to finance capital from current revenue.

An alternate approach to capital financial management is the accumulation of **reserves** or surpluses in the budget. Rather than rely on paying back the cost of capital works through debt financing, a municipality may elect to accumulate funds, so that capital works can be paid in whole or in part, 'upfront'. This financial cushion is also needed in the event of an emergency, to cover in-year unexpected expenditures, or in the event of

a downturn in the economy, to finance the increase in welfare and other social service expenditures. Prior to the recession in the early 1990s, reserves were a significant factor in the majority of municipal balance sheets. The recession depleted reserves of many municipalities. And despite the subsequent period of economic prosperity, pressures to freeze the municipal tax rate along with other changes previously mentioned have made it difficult for municipalities to build their reserves once again.

2.3 Municipal Services Finance

Over the last dozen years, several attempts have been made by different provincial governments to define the services, role and responsibilities for the corresponding and financial relationship between the province and municipalities.

2.3.1 Attempts at Recasting the Municipal-Provincial Relationship

In the late 1980's, the *Liberal* Government let the first shoe drop when it decided to freeze provincial transfers. The provincial Treasurer suggested that it made sense to freeze transfers since it was clear the province was facing potential deficits and increasing debt loads. In the opinion of the Treasurer of Ontario, municipalities were increasing their reserves. The freeze occurred during relatively good economic times. Taking away what the municipal sector saw as its legitimate right to reasonable increases in the provincial transfers towards the increasing cost of highways, transit, health, resource equalization and the like was not well received.

The *New Democratic* Government of the early to mid 1990's attempted a more fundamental and direct approach. Its 'Disentanglement' process was based on the Report of the Advisory Committee on the Provincial-Municipal Financial Relationship (The Hopcroft Report). This process had as its goal "a definition of roles which gives each level of government clear responsibility and accountability for specific functions and the authority and resources to perform its role effectively". In addition, the principles upon which the process was founded included statements that "services which are income redistributive should not be financed from current municipal revenue sources' and neither the province nor the municipal sector should bear a greater share of financial responsibility as a result of disentanglement".

The first step in the disentanglement process resulted in a joint provincial-municipal committee proposal that the municipal portion of General Welfare Assistance (approximately $340 million) be assigned to the Province in return for: (1) municipal assumption of certain provincial highways and changes to highway conditional grants ($40 million), (2) municipal assumption of property assessment services ($135 million) and (3) reduction in provincial unconditional grants to municipalities ($165 million). This was intended as the first phase of a plan that, if accepted by the Provincial Cabinet and the municipal sector, would lead to further disentanglement exercises of such things as funding of Childrens' Aid Societies and other income redistributive programs, which would be uploaded in return for more hard service responsibilities at the municipal level.

However, this proposal, which enjoyed broad support, ran into difficulty when the

Province introduced its Expenditure Control Program the same day as the municipal sector was considering the disentanglement proposal. The government, faced with an unprecedented recession and a $9 billion deficit, introduced a $4 billion Expenditure Control Plan, which resulted in a $190 million reduction in conditional and unconditional grants to the municipal sector. It was also accompanied by a $2 billion Social Contract, the municipal portion of which was determined to equal $285 million. As a result of the Social Contract, the Province inserted itself into the municipal employee/employer relationship and became more directly involved in day-to-day operation of the municipal level of government than had been the situation with previous governments.

Even though the municipal sector supported the goals and principals surrounding the 'Disentanglement' process, it rejected the proposal because of the unprecedented, unilateral cutbacks to municipalities through the Expenditure Control Program and the Social Contract. In addition, the inability to agree upon an appropriate dollar value for the general welfare assistance trade and other components, such as lack of control over managing the assessment function, frustrated municipal elected representatives.

During the balance of the *New Democratic* Government's term, the municipal sector struggled with the changes resulting from the reduction in conditional and unconditional transfers and the effects of the Social Contract. Added to this pressure were impacts of the economic downturn. Ontario experienced a prolongued recession in the first half of the 1990s, causing the cost of income redistribution programs such as welfare payments to skyrocket. The increase in social service costs due to the recession had a devastating effect on municipal budgets. At the time, municipalities were paying 20% of General Welfare Assistance (GWA) costs and 50% of administration costs. They were also 'protected' by a provincially funded insurance plan whereby the municipal contribution for GWA dropped to 10% if more than 4% of the population was in receipt of assistance. Even with these safeguards, municipal social services costs tripled during the recession.

Municipalities responded to the decrease in provincial transfers during difficult economic times in a number of ways. It was clear that they could not turn to the already overburdened property tax payer for an increased contribution. Instead, municipal councils sought further efficiencies, turned to and used their reserve funds, and rationalized and reduced services as a means of coping with the reduction in provincial support and the increase in social services expenditures.

2.3.2 Who Does What & Local Services Realignment

When it was elected in 1995, the *Conservative* Government faced the dual problems of substantial annual deficits and unprecedented debt loads. The government made it clear that it intended to reduce taxes and reduce spending at both the provincial and municipal level. Its *Common Sense Revolution* called for a reduction in the number of municipal governments, a reduction in the number of elected municipal politicians and redefinition of the municipal/provincial relationship. Its redefinition of the municipal/provincial relationship came with the announcement of the Who Does What process.

In early 1997, after considering the recommendations of the Who Does What Advisory

Committee chaired by David Crombie, the government set out its decision on Who Does What. The recommendations of the Crombie Panel and the government's plan were not identical. At the time of the announcement the government stated that its key objectives were:

- greater accountability to taxpayers;
- protecting priority services and maintaining critical standards;
- streamlined service delivery;
- better rationalized funding responsibilities;
- capitalizing on local expertise and innovation;
- greater autonomy for municipal government; and,
- reduction of duplication and waste.

In May 1997, as a result of municipal sector and others' reactions, the provincial government proceeded with Local Services Realignment (LSR), under which the Province would assume responsibility for approximately 50% of the education portion of the residential property tax bill in exchange for a number of programs to be transferred and financed by the municipal sector. In exchange for this tax room, the Province transferred responsibilities to municipalities whose costs would more or less equal the expense of the education tax.[11]

The difference, between the removal of the education tax and the addition of new responsibilities, was calculated for each municipality and if a gap resulted, a compensation mechanism, known as the Community Reinvestment Fund (CRF), was applied. This was how 'revenue-neutrality' was to be achieved, at least at a province-wide basis and at the moment of the announcement.

The responsibilities transferred to municipalities include social assistance, child care, public health, land ambulance, social housing, the cost of operating the Ontario Property Assessment Corporation (OPAC)[12], operating and capital for transit, including GO Transit, airports, septic inspections, policing, managed forests/conservation lands rebate, and the farm tax rebate.

In addition to these new responsibilities and expenditures, municipalities lost some sources of revenue, including fees paid on gross receipts by telecommunications companies, and the loss of municipal support grants. This loss of revenue was to be offset by the fact that the province assumed the cost for Children's Aid Societies and transferred the administration of the *Provincial Offences Act* and the resultant estimated net revenue to the municipal sector.

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[11] In large urban municipalities approximately 50% of an average pre 1997 residential property tax bill would have been for education purposes and 50% for municipal purposes. WDW reduced the education tax to 25% of the tax bill. In rural areas and smaller urban areas approximately 60-70% of an average pre 1997 residential property tax bill would have been for education purposes and 30-40% for municipal purposes. WDW reduced the education tax to 33% of the tax bill.

[12] OPAC has recently been renamed the Municipal Property Assessment Corporation.

Finally, the Province unilaterally set saving targets, as part of the LSR. Municipalities with populations of fewer than 100,000 had to save 3% of their own purpose spending portion of their budget. Municipalities with populations of over 100,000, had to save 4.3% of their budget through efficiencies. These arbitrary saving targets were deducted from the value of the Support Grant before determining its net value.

LSR not 'revenue-neutral'

There has been much debate about whether the downloading of responsibilities to municipalities combined with the uploading of 50% of education tax resulted in a 'revenue-neutral' exchange. The very fact that most municipalities required an adjustment through a CRF payment from the province suggests that any 'education tax room' was more than used up.

The 'revenue neutrality' of Local Services Realignment was further complicated by the fact that other responsibilities and expenditures were transferred to municipalities, which were not factored into the LSR/CRF, including roads and bridges, short and long-term capital requirements for social housing, new POA court facilities, transit, airports and the like. One notable transfer that was left out of LSR/CRF was the transfer of over 5,000 kilometres of provincial highways to the municipal sector. When the highways were transferred, the municipalities received transitional funding to cover the Province's estimated cost for only 3 years of maintenance, along with 66% of the estimated 1-5 year capital requirements. The maintenance funds, which were in 1996/97 dollars were generally insufficient by the third year after transfer. Furthermore, the capital funds, which represented only 66% of the estimated 1-5 year needs and which were also in 1996/97 dollars, were woefully inadequate when municipalities moved to reconstruct highways and bridges that were in desperate need of repair.

As well, the LSR costs were based on provincial costs, not municipal cost, and so tended to overestimate the 'savings' from the transfer, and underestimate the cost of operations at the municipal level. For example, municipalities have different Workplace Safety and Insurance Board (WSIB) and insurance requirements from the Province. They also must pay Provincial Sales Tax on equipment and services.

Perhaps the most problematic aspect of the LSR deal was the transfer of uncontrollable, open-ended income redistribution programs to the municipal sector. In the event of an economic downturn, the costs of social assistance, social housing and childcare alone, which account for close to 60% of the LSR transfer package, will likely create unbearable pressures on the property tax. In these programs the Province sets the rules and standards, hence the total expenditures.

Whether or not LSR was 'revenue neutral' the day it was announced, is not a useful debate. What is indisputable, however, is that the costs of open-ended social programs and the capital requirements associated with many of the responsibilities transferred to the municipal sector have exposed the property tax payer to an unprecedented set of risks that are unique to Ontario property owners.

2. 3.3 The State of the Municipal – Provincial Financial Relationship

The municipal sector argued and continues to argue for a provincial-municipal revenue sharing program whereby the Province, which has many more sources of revenue, transfers part of its revenue from personal income tax, corporate tax, general sales tax or fuel tax to the municipal sector.

With a fundamental shift in the delivery of programs and services once delivered by the province, the call for new sources of municipal revenue is all the more convincing. In the absence of such a shift in revenue-allocation, a sustainable, dependable, long-term, non-conditional transfer system to meet and deal with the financial exposure is required.

This does not necessarily mean a return to the old system of conditional grants. In the past the municipal sector criticized the conditional grants process, primarily because it distorted local government spending. Budgets were often developed around maximizing the availability of conditional grants, thereby seeking to meet the grant program criteria rather than reflecting and prioritizing the needs of the community, which do not always match. The conditional grant process resulted in the municipal sector meeting Provincial goals, not specific municipal objectives, and these often differed.

The municipal sector welcomed the most recent capital infrastructure project, SuperBuild, which now includes federal funds under the Federal-Provincial Agreement. However, the process again leans towards addressing federal or provincial goals, or "strategic investments" rather than specific municipal needs. As with previous programs, this has the potential to distort municipal priorities. The recent announcement that SuperBuild funds are available for cultural facilities when highways may be the local municipal priority is an example of this effect. In addition, there is no certainty for municipalities as to the success of an application. As with previous infrastructure funding, the current program is of a limited duration.

Perhaps the best indicator of the municipal perspective on the provincial-municipal financial relationship comes from a recent survey conducted by AMO of its membership[13] (AMO, 2001). In response to the question, " On balance, do you believe the Province's policy toward municipalities is on the right track or wrong track?", 78% of respondents indicated that the Province was on the 'wrong track', while 13% responded that it was on the 'right track'. In response to the question, "What is the most important provincial-municipal issue facing your community right now?", the most common responses related to:

- the financial situation (lack of funding/sources of revenue)
- municipal restructuring and its impacts
- downloading of service
- micro-management by the Province

The municipal sector feels that it cannot be expected to build the communities required

[13] See '*A Report on Provincial-Municipal Relations: A Survey of Ontario's municipalities April 2001*', on the AMO website at www.amo.on.ca .

to ensure that our economic success and quality of life continue unless there is a new financing arrangement whereby the Province assumes the cost of income redistributive programs. The municipal sector realizes that this cannot happen all at once and that a mutually planned strategy is needed. Failing this, the Province must provide municipalities with a consistent, sustainable funding transfer system. Such an arrangement would allow the municipal sector to benefit from the vast array of revenue sources enjoyed by the Federal and Provincial levels of government to support their delivery of mandated social and health programs.

2.4 Conclusion

The municipal sector has undergone extensive changes in all major areas of its responsibility over the last five years, from amalgamations, to tax policy, to tax assessment, to downloading. The Who Does What process did rationalise the provincial- municipal relationship in some areas, by more clearly separating their respective roles and responsibilities, and by simplifying the somewhat complicated financial relationship between the two levels of government. In other areas, these outcomes have not been fully achieved.

Unfortunately, the provincial implementation of its version of WDW, Local Services Realignment, has resulted in increased costs to municipalities, and an ongoing, convoluted calculation of adjustments to achieve so-called 'revenue-neutrality' for each municipality on an annual basis. Meanwhile, more provincial programs and responsibilities continue to be transferred to municipalities with inadequate financial compensation.

The relatively static, inflexible municipal revenue sources are being stretched to the limit. The province must remove income-redistribution programs from the property tax base. And it must offer municipalities new sources of revenue, to give them the resources necessary to reinvest in essential infrastructure, and to provide programs and services to residents and businesses.

3. OVERVIEW OF DRINKING WATER SERVICES IN ONTARIO

3.1 Introduction

Questions of the financial sustainability of the public water system are once again in the minds of public decision makers. Gloomy figures of the multi-billion dollar infrastructure deficit may give the impression that the problem is insurmountable, that the system has been left to deteriorate for too many years. While the infrastructure deficit is indeed in need of immediate attention, the situation should be put into perspective.

Ontario is by no means alone in facing the dilemma of accumulating public infrastructure costs and decreasing public funding to match these costs. Water and sewer works are, by their very nature, highly capital intensive. All societies with extensive water infrastructure networks have struggled with the cost of replacing aging infrastructure. Over the last 10-20 years, this has most often occurred in a fiscal climate of cutbacks to long standing public support for building up infrastructure in rapidly growing and underserviced areas.

To Ontario's advantage, much of its water infrastructure is much younger than in Europe and some parts of the U.S. The question of how to pay for the replacement of the system has only become a pressing public policy issue in recent years. And waterworks infrastructure, and infrastructure more generally, has benefited from generous federal and provincial grant programs over several decades. An infrastructure deficit has been allowed to accumulate over the last 5-10 years, due to poor economic times in the early 1990s, and pressure to keep taxes down and control public expenditures more generally. Any attempt to addressing the accumulated deficit of the past must also be forward looking, to put into place a plan for sustainably financing Ontario's drinking water system into the future.

This section provides an overview of the municipal water treatment and distribution system in Ontario. It explores the infrastructure financing gap. It explains the cost of building, operating and replacing waterworks systems, and how waterworks have been paid for to date. It ends with questions on the sustainability of current financing arrangements and the trend towards full-cost recovery.

3.2 Background on Waterworks Operations in Ontario

3.2.1 Waterworks operations in Ontario

Municipalities play the central role in the provision of public drinking water to Ontarians. According to the Ontario Ministry of the Environment (MOE), about 8.9 million Ontarians, representing 82% of the provincial population, receive their drinking water from municipal waterworks (OMOE, 2000.p. 3). The remaining 18 % is serviced by private water systems, such as household or communal wells/direct surface-water connections, the latter frequently approved by MOE.

The Ontario public drinking water network is characterised by a concentration of large systems, and a myriad of medium to smaller systems, mirroring the geographic distribution of the province's population. As of 1997, seventeen municipally-run

waterworks provide drinking water to over 65% of those Ontarians serviced by municipal systems. Seventy-four per cent of all waterworks are small systems providing drinking water to communities of 3,300 people or less (OMOE, 2000.p. 10).[14]

Of the approximately 627 municipal waterworks in Ontario, 399 draw from groundwater, 225 draw from surface water, and three draw from a combined surface and groundwater source (OMOE, 2000.p. 3).

3.2.2 Operation and Management of Municipal Drinking Water Services in Ontario

The organization of public water services management has evolved over the years, in response to changes in municipal governance and the role of the Ministry of the Environment.

The MOE used to own and operate about 25% of all water and sewage treatment plants in Ontario. In 1993, the water treatment division of the MOE was made into a separate crown corporation, the Ontario Clean Water Agency (OCWA), which assumed ownership of the provincial water and sewage treatment plants[15].

Then, in 1997, the Water and Sewage Services Improvement Act transferred the ownership of these water and sewage treatment plants that were owned and operated by OCWA to municipalities. In total, 230 plants were transferred, bringing the total number of public treatment plants, 937, under exclusive ownership of the municipal sector.

Municipal water services, delivered through a municipal waterworks department or a public utility commission, operate 77% of municipal waterworks. The Ontario Clean Water Agency (OCWA) operates approximately 19%, under contract with municipalities, while eight waterworks are operated by private contractors, again under contract with municipalities. Five waterworks in Northern Ontario are privately owned and operated. One waterworks is owned and operated by a Local Services Board, and one is owned by the Province of Ontario (OMOE, 2000.p. 10).

Upper tier-lower tier

Responsibility for water services may be undertaken by either an upper or lower tier municipality. Most lower tier municipalities located in counties and single-tier structures have responsibility for water services. However, there are exceptions. For example, the restructured County of Oxford (which is somewhat of an anomaly as counties go) has responsibility for lower tier water services. Among the remaining six regions, the regions of York, Niagara, and Waterloo are responsible for water treatment, and are the wholesale suppliers of water to lower tier municipalities, which have responsibility for distribution. The regions of Durham, Halton and Peel are responsible for both water treatment and distribution.

[14] These figures may have changed slightly due to recent municipal amalgamations.
[15] See the *Capital Investment Plan Act.*

Internal Department or PUC

Municipal waterworks are managed either through an internal department, or, in the case of lower tier municipalities or those in unorganised areas, through a public utility corporation (PUC). Municipalities are entitled to establish PUCs under provisions of the Public Utilities Act (as well as Municipal Act provisions). Under such an arrangement, the municipality retains ownership, but management is transferred to an elected Commission, which typically was responsible for electricity distribution as well. The Commission operates with relative autonomy, responsible for setting rates, and for planning and operating the water system(s). The PUC only requires municipal council approval for major capital works. A member of council sits as a member of the Commission. Municipal authority does extend over the use of PUC operating surpluses or unused reserve fund monies, which can be redirected to general municipal revenues.

In 1990, 139 of 400 lower or single tier municipalities ran their waterworks through a PUC. Almost all of these PUCs were also responsible for other utilities, including electricity and sewage management (Fortin &Mitchell, 1990.p.8).

Then in 2000, with the introduction of the Electricity Competition Act, the electricity side of many municipal PUCs were incorporated, as part of the process of electricity sector restructuring. This left the water (and sewage) side of the utility on its own. Many municipalities elected to disband the PUC and integrate the water and sewage functions into municipal government as an internal department. Only 15 PUCs responsible for water remain (Sancton & Janik, 2001.p. 26).

3.3 The Cost of Drinking Water Infrastructure and Services

3.3.1 The Cost of Drinking Water Infrastructure in Ontario

Supplying water is a capital-intensive business, requiring the construction and maintenance of a physical treatment and distribution system to deliver safe water to millions of Ontario households and businesses. And treatment and instrumentation costs change over time, due to new regulated monitoring and reporting requirements, and information of the harmful effects of newly discovered pathogens or chemical contaminants.[16]

The sophisticated system that exists now has been paid for by previous generations, through user fees, municipal taxes, and provincial and federal grants. This system, or rather, its components parts, must gradually be replaced. Municipalities must plan for the cost of replacing their systems, and distributing the cost to users over time in an equitable fashion.

[16] The presence of cryptosporidium and giardia in surface water has lead the Ontario Government to require that all large waterworks drawing from surface water install a filtration system. Also, see Box 2, on DWPR costs.

The Lifecycle of Water Infrastructure

The challenge in meeting the costs of expanding and replacing water system infrastructure, is that cost is a function of the life of infrastructure. This requires planning to meet significant expenditure peaks, when initially installing the treatment plants and mains, and eventually replacing them 50-100 years later. In addition to the peaks, there is the year-to-year investment in maintenance and rehabilitation, to prolong the useful life of the infrastructure.

Ontario's water infrastructure, 80% of which is underground, is younger than that of other industrialised societies in Europe and in the U.S. It has only been relatively recently that the province has been faced with massive replacement costs. But as these investments come due, the owners of public systems, the municipalities, are finding less and less in the way of senior government financial support, which was readily available when the systems were originally built.

The cost of gradually replacing all the infrastructure as it reaches the end of its useful life is the most costly aspect of maintaining a drinking water system. The American Water Works Association recommends a replacement cycle of 67 years for waterworks distribution systems**.** Other utilities plan for a 100-120 year-cycle (McLaren,1987.p.4). In reality, the life of a watermain is contingent on a variety of factors, including age, the original design, the materials employed, the manner of construction, foundation disturbance over the years, vibration, corrosion, and the quality of maintenance over the years. For example, many municipalities are finding that their steel and cast-iron pipes are prone to corrosion, requiring constant repairs. So, for example, pipes in a corrosive clay soil will likely need replacing sooner than the same pipes in a non-corrosive sandy soil.

Typically, the cost of replacement therefore remains low for the first 50 years of the infrastructure's life, then begins to climb as pipes reach the end of their useful life and require replacement or rehabilitation to prolong their life, and ultimately peaks with the replacement of the treatment technology, and then begins to decline, as the rest of the watermain infrastructure is gradually replaced. A profile to anticipate the cost peaks of this 50-120 year lifecycle has been dubbed the 'Nessie Curve'.

The Provincial 'Infrastructure Deficit'

From the 1940s to the 1970s, investment in water infrastructure kept pace with demand for increasing quantities of water and growing service areas. By the mid-70s, pipelines were beginning to enter the twilight of their 'theoretical' structural life, and were beginning to need replacement or rehabilitation. As early as the 1980's, the MOE was aware of an impending water and sewer infrastructure replacement crunch. As a 1982 internal MOE report documented,

> *Many built up parts of Ontario were already serviced with watermains before 1950 and these systems are now in an advanced stage of their working life. Repair and replacement of existing systems could now be expected to be taking up an increasing portion of municipal capital construction expenditures. The Ministry should therefore be keeping aware of these expenditure trends and needs for renewal and replacement involving watermains and distribution systems (McLaren, 1987, p.1).*

Estimating the cost of replacing water mains is a tricky business as there is no comprehensive inventory of Ontario's water infrastructure assets. Without such an inventory, we must rely on estimates of the replacement value of the 500 water treatment plants, as well as estimates of the length of watermains across the province, their varying ages, and today's cost of replacing them. In the absence of consolidated, detailed records of the condition of pipelines in Ontario, a number of efforts have been made over the years to calculate Ontario's waterworks 'infrastructure deficit', based on different assumptions, with varying results.(see table, below) (McLaren, 1987; Elstad, 1987; OSWCA, 2001).

Table 1: Past Estimates of Ontario's waterworks 'infrastructure deficit'

Study	Watermain (km)	Total Value	Total investment required	Annual investment required
MOE 1983	37,600	$21.2 billion	N/A	N/A
MOE 1987	N/A	N/A	N/A	$ 50 m ($1983)
C'da Works 1987	+26,000	N/A	$3.0 billion	$ 77 m ($1987)
OSWCA 1987	N/A	N/A	N/A	$ 140 m ($1987)
MOE (early 1990s)	N/A	N/A	$2.5 billion	$166 m over 15 yrs
OSWCA 2001	45,000	N/A	$4.0 billion	$266 m over 15 yrs ($2001)

However, there is a fundamental limitation to these types of estimates. Each of them is based on looking to the past, and determining what investment in infrastructure rehabilitation is needed to bring all waterworks infrastructure in the Province to roughly the same standard. This only provides part of the picture. What is needed is a forecast of perpetual, anticipated investment needs. Such an estimate must be based not only on rehabilitation costs, but perhaps more importantly on replacement costs and anticipated expansion and upgrade costs into the future.

The Ontario Sewer and Watermain Construction Association has recently estimated that Ontario's combined water and sewer infrastructure is worth $60 billion (OSWCA, 2001). In a 2000 paper prepared for the Ontario Water Works Association, their combined value was estimated at $50 billion, although it suggested their replacement cost could be as much as twice that (Powell, 2000). Assuming that water infrastructure makes up half that total value, then its replacement cost would be somewhere in the range of $30-$50 billion.

This amount may seem staggering, but it is not one that must be met in the short term. It is not a deficit. It is the value of the system that needs replacing over the lifetime of the asset. In the same OWWA report, Powell offers an annual replacement cost of 2% (Powell, 2000). In a recent assessment of the value of its water infrastructure, the City of Hamilton used an annual investment cost of 3.5% - to capture replacement and anticipated expansion and major maintenance and upgrades.

Table 2: Estimated Waterworks Infrastructure Replacement Value and Annual Investment Required

	2% annual investment	**3.5% annual investment**
Estimated Replacement Value: $30 billion	$600,000,000	$1,050,000,000
Estimated Replacement Value: $50 billion	$1,000,000,000	$1,750,000,000

Using these figures, the annual level of investment needed to sustain Ontario's water infrastructure into the future ranges from $600 million to $1.75 billion. It should be noted, that these are very broad estimates, that are not based on a comprehensive assessment of the actual condition or value of water infrastructure in Ontario.

3.3.2 Costs at the Municipal Level

While province-wide figures are useful in order to grasp the magnitude of the investment needed in the system, putting such investment in context at the local level better reflects the differing needs in different types of communities, both in terms of the actual capital upgrade requirements of a given municipal system, and the community's ability to pay. Ability to pay at the local level must consider not only needed capital investment, but also annual operational expenditures.

It is difficult to give an average figure for the cost of drinking water at the local level, or to compare the costs of water services of municipalities with different types of systems. Systems are simply not uniform enough to do so.

Key factors that affect the cost of water per household include:

- the source of the water, both its proximity and its quality, and whether it is surface water or groundwater;
- the nature of the treatment;
- the population density of the service area;
- the number of people served;
- the number of industrial, commercial and institutional customers served;
- the daily flow and total capacity of the system;
- the distance covered by the distribution system;
- the age of the system or different parts of the system;
- the materials used as the system was being built ;
- changes in water quality standards and regulatory requirements.

BOX 1: Economies and Dis-economies of Scale in Water Services

Economies of scale is an economic principle commonly applied to manufacturing or commercial services. It is based on evidence that as a company or organisation increases its output (or service base), the marginal cost of producing each additional unit (or to reach each additional customer) decreases, ie. the more you make, or provide, the more cost-efficient the operation.

Extending this principle to water supply would suggest that, all things being equal, water could be treated and distributed more cheaply if water services were provided by fewer organisations servicing larger areas/more customers.

This is true in some circumstances. However, the particular characteristics of water service delivery costs must be factored in. Economies of scale can actually have *decreasing returns,* particularly in sparsely populated areas (Renzetti, 1998). This is because distribution costs typically range from 65-75% of total water service costs (OMWA, 2001). As Steven Renzetti of Brock University concludes in his study on water pricing reforms, " *An important implication... is that improved operational efficiencies are unlikely to come from expanding the scale of water delivery systems*" (Renzetti, 1998).

Marginal costs rise with distance. The longer the distance, the costlier the distribution network. If the network is serving a fairly densely populated area, the per household cost will be relatively low. However, in rural-based areas, with few customers per kilometer, the added per household cost can be quite high. So while some efficiencies may be gained by merging the operations of water service delivery of two or more municipalities, these savings could be cancelled out by the costs of maintaining and replacing the distribution networks serving a disbursed population.

<u>What is included in municipal drinking water costs?</u>

The costs of municipal water management can be broken down into two broad categories, capital costs and operational costs.

Capital costs include the rehabilitation, replacement or expansion of watermains, water service pipes, treatment technology, buildings, pump houses, dams, wells, meters, reservoirs, storage tanks, hydrants, valves, computers, rolling stock, tools, and land or land rights.

Operational costs include operational, maintenance, and administrative costs, such as costs associated with the operation and maintenance of water treatment (including treatment, monitoring, reporting, etc), storage tanks, mains, maintenance of watermain breaks, leak detection, meter reading, billings and collection, rolling stock, engineering, and administrative costs associated with an office and service centre, data processing, general administration, customer service. Other costs include labour salaries, benefits, treatment materials (chlorination, fluoridation, etc), electricity, and fuel.

BOX 2: Costs Associated with Meeting Provincial Drinking Water Standards

Both capital and operational costs have increased significantly in Ontario since the introduction of the Ontario Drinking Water Protection Regulation in August, 2000.

The Province is offering funding through SuperBuild towards new capital costs. However, municipalities must absorb increased operational costs associated with the new requirements. These include:

- a wider range and more frequent testing parameters. Some municipalities are particularly concerned with mandatory quarterly testing for parameters such as pesticides and PCBs , regardless of previous presence of either in the water source.
- operator on site 7 days a week
- mandatory operator training-costs include replacement staff while operator is on training.
- mandatory requirement to send water samples to an accredited lab for analysis
- mandatory requirement to engage an independent engineering consultant every three years to review the water treatment operations;
- cost of a new certificate of approval for all treatment systems.

Those hardest hit are:

- smaller systems serving areas with few water connections, as spreading the cost amongst fewer customers means a higher rate increase per household;
- those municipalities whose water service is made up of a number of smaller systems (rather than a single system). For these systems, the cost of any new operational requirements must be multiplied by the number of systems serving the municipality. This means some municipalities are facing 5-10 times the operational costs that other municipalities are facing.

The cost impacts of the regulation are best illustrated through examples:

- In Oro-Medonte, whose public water system serves only about 2,500 of its 16,000 residents, operational costs have increased dramatically because the public system is made up of 11 separate systems. Anticipated costs for alarm system and back-up chlorinator per system-$21,000, totaling $231,000. New quarterly testing requirements cost 10-15 times more, and now stand at $6000-$7,000 for each system.
- In Howick Township, increased operational requirements due to the new regulation, including daily and quarterly testing, increased electricity costs, cost of the Engineer's report, and daily monitoring, will cost an added $19,000. This represents a five-fold increase in operational costs, an increase per household of $760 per year. There are 25 households on the system.
- In Billings Twp, the cost of the new regulation is estimated to be $1,000 per household for the 150 users of the system.
- Property owners serviced by the municipal systems in the former Amabel Township (South Bruce Peninsula) may be facing water rate increases of almost 300%, as a result of the regulation. Rates are expected to increase from $380 per year to almost $1,100 per year.
- Oxenden in Grey County has had to raise its water rate by 50% solely due to the new provincial water testing requirements.
- Drinking water system operating costs are expected to go up 24% in Central Manitoulin, and 21% in Assiginack, to comply with the new drinking water regulation.
- New operational costs for the Village of Bayfield for staff conducting new testing requirements consumed 1/3 of its water reserve fund in 2000. This represented a $5-6,000 in-year hit.

Both operational and capital costs will change over time. Operational costs change as regulatory requirements and water quality standards and public expectations change (see Box 2, above). Capital costs change as technology changes, as systems grow, and as infrastructure ages.

3.4 Financing of Drinking Water Services in Ontario

3.4.1 Trends in Municipal Capital Expenditures

Municipal investment in waterworks infrastructure has had several peaks and declines over the last ten years (see Figure 2, below). There appears to be a correlation between Increases and decreases in expenditures and the availability of senior government grants (see Figure 3, below).

The percentage of total waterworks expenditures paid by federal and provincial grants has varied considerably since 1989, from a high of 29% of total waterworks expenditures in 1995, to a low of 5% in 1998. Of total expenditures throughout the 1989-99 period, federal and provincial grants accounted for 19% of these expenditures.

Waterworks capital expenditures were relatively high at the start of the decade, having climbed 60% over four years, from $200,000,000 in 1987 to $333,000,000 in 1990 (Financial Information Returns, 1987-1990). The rapid increase was likely linked to the steady infusion of provincial dollars dedicated to water and sewage works through the LifeLines program. However, expenditures then quickly dropped off by 21% in 1992, the same year that total grants declined by 33%. With the injection of senior government grants both from the 1994-95 Canada-Ontario Works Funding program and the Ontario Municipal Assistance Program, waterworks infrastructure expenditures once again rose, to an all time high of $488,000,000 in 1995, representing a 30% increase from 1992.

Oddly, during the economic recovery in the last half of the 1990s, municipal expenditures declined by nearly 20%, this despite a second round of Canada-Ontario Works funding. In that period, both federal and provincial grants declined dramatically, by 80% and 71% respectively from 1995-1999. In that period, total municipal waterworks capital expenditures declined by 19 per cent. The relationship between total expenditures and grants received is illustrated in Figure 3, below.

The data in Table 3, below, suggests that senior government grants, while only making up an average of about 20% of total expenditures, have the effect of leveraging more municipal funding.

With annual investments in 1999 of approximately $400 million and estimated annual investment needs in the range of $600 million to $1.75 billion, investment is falling short each year by an estimated $200 million to $1.35 billion, based on the rough estimates of necessary annual investments outlined in Table 2.

Table 3: Municipal Waterworks Capital Expenditures and Grants in Ontario 1989-1999 (Source: Financial Information Returns, 1989-1999)

YEAR	Total Capital Expenditures ($000's)	Total Grants, federal and provincial	Percentage of Total Expenditures Paid for by Grants
1989	332,631	70,529,899	21
1990	381,166	60,601,936	16
1991	369,060	83,165,375	23
1992	302,050	56,000,684	19
1993	338,547	75,685,189	22
1994	393,240	108,578,934	28
1995	488,264	139,859,071	29
1996	454,639	105,657,931	23
1997	425,851	40,654,116	10
1998	394,986	19,171,810	5
1999	398,676	37,949,545	10

Figure 2: Municipal Capital Expenditures, 1989-1999

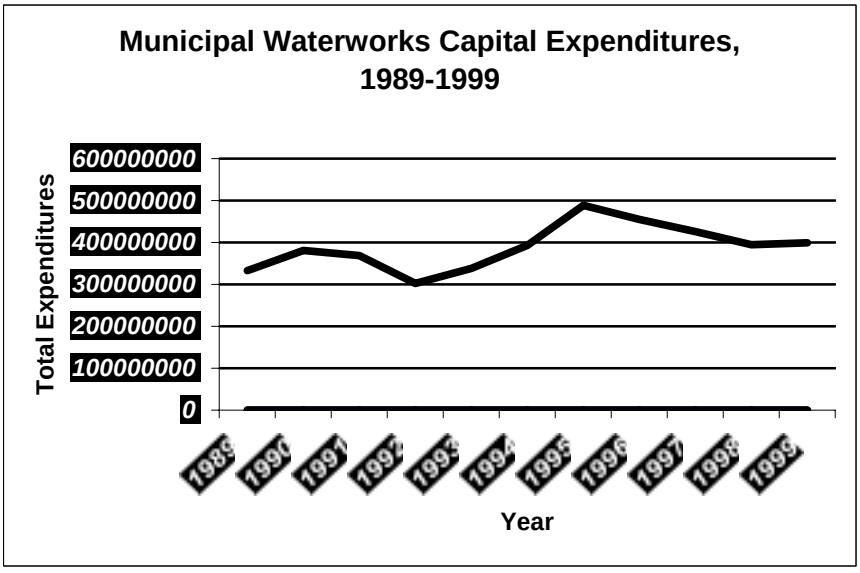
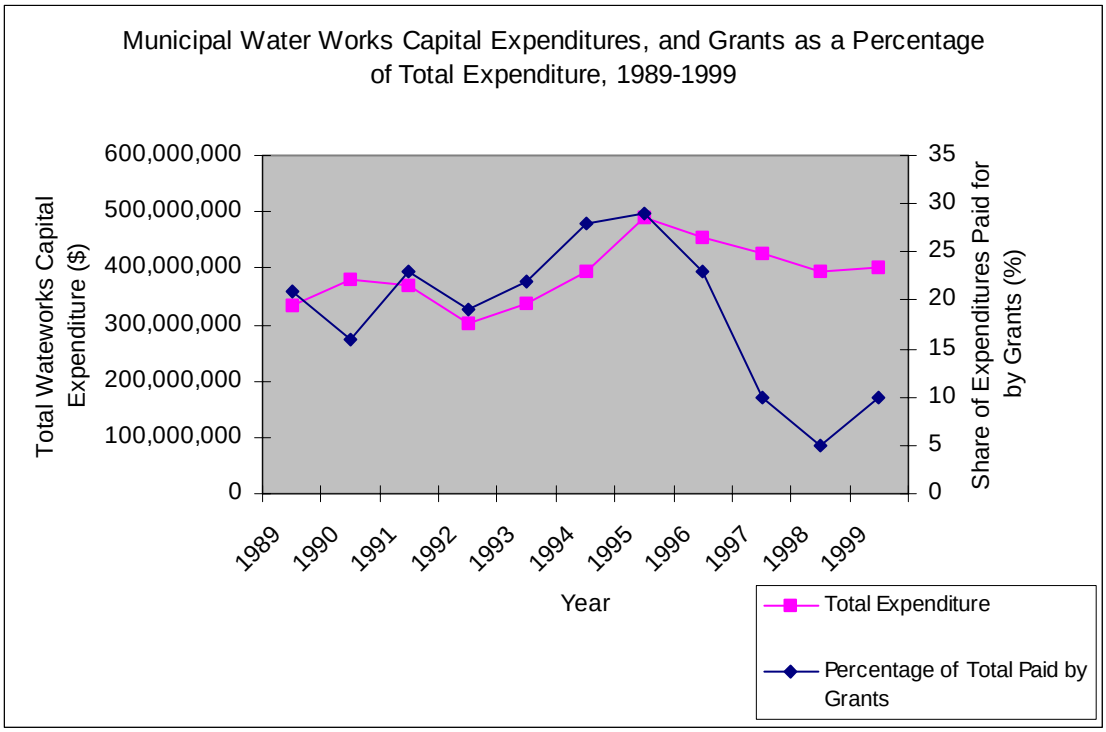


Figure 3: Comparison of total municipal waterworks capital expenditures and senior government grants, 1989-199



3.4.2 A Changing Provincial-Municipal Partnership

The financing of the province-wide public drinking water system has been based on a partnership between the province and municipalities for many years.

During the post WWII era, from the 1950s-1970s, the provincial government, and to a lesser extent, the federal government, invested massively in water infrastructure to keep pace with, and promote, economic growth in the Province. These public funding programs paid the steep 'start-up' costs of the sophisticated municipal water infrastructure systems that most Ontarians benefit from today.

This financing partnership continued through the 1980s. The Province established programs designed to finance the rehabilitation and expansion of systems. Municipalities relied on the established, ongoing grant programs of senior governments to cover a share of their capital costs.

However, over the last 10 years, this ongoing public infrastructure investment partnership has given way to an ad hoc series of funding programs, with the amount of senior government funding to support water and other infrastructure declining dramatically.

Funding Programs over the last decade

As explained in the previous section, the ongoing province-municipal financing partnership lasted until the early 1990s.

Two main programs provided ongoing funding for the construction and rehabilitation of water and sewage facilities in the late 1980s and early 1990s. The first and longest running ongoing program, the *Direct Grant Program*, was an MOE administered funding program, which was established in 1978 and ran through to 1993. The program was focused on the development and construction of facilities. New funding was made available every year. For the first six years, up to 75% funding was provided for eligible capital costs. In 1984, the funding formula was modified in favour of smaller municipalities. The level of funding was determined based on the population of the community. Grants ranging from 15-85% of eligible project costs were available to communities with populations of less than 7,500. For municipalities with populations of over 7,500, grants were provided for only 15 % of eligible project costs.

The *Lifelines Program* was another ongoing MOE grants program for water and sewage works, which ran from 1987-1992. The Lifelines program was established to complement the Direct Grant Program, by providing funding for the rehabilitation of existing water and sewage works.

The *Municipal Assistance Program* (MAP) replaced the *Direct Grants Program* and the *Lifelines Program*. Due to a change of government, it is not clear if this was meant to be an ongoing program. Introduced in 1993 and administered by the newly created OCWA, MAP provided funding for water and sewer construction to promote growth and development and to promote public health and environmental protection. The program only lasted a couple of years before being sunset, although disbursements continued until 2000. It once again favoured smaller municipalities. Those with populations of less than 15,000 received up to 70% funding and municipalities with populations between 15,000-20,000 received up to 18 1/3 % funding. All municipalities were eligible for funding of up to 15% of capital costs.

The *Provincial Water Protection Fund*, introduced in 1997, was a three-year fund administered by MOE as part of the Who Does What Municipal Capital and Operating Restructuring Fund. It was meant to assist municipalities in the transition to full responsibility for financing and operating water and sewage services. It was limited to supporting only those municipalities with upgrades for demonstrated specific health and environmental problems, based on monitoring data and public health advisories. For the first time, no support was provided for growth-related infrastructure.

Funding ranged from 15%-85% of project costs, depending on financial need. This would include population, average household income, level of discretionary reserve funds, and the size of the assessment base.

The PWPF provided significantly less funding than previous provincial waterworks funding programs. Provincial funding declined from $96,000,000 in 1996, to $37,000,000 in 1999, the last year of the PWPF.

The most recent provincial funding program, SuperBuild's *Ontario Small Town and Rural Program* (OSTAR), was not initially designated as a fund for water and sewage projects. It was originally designed to promote rural economic development. However, following the Walkerton tragedy, and the introduction of a stringent Provincial Drinking Water Protection Regulation, the Provincial Government designated $240 million towards water and sewage infrastructure projects to bring municipalities in compliance with the new regulation, and/or to address any immediate health and environmental problems.

No further provincial funding for water and sewer works has been announced since.

Table 4: Grant Programs At- a- Glance

Grant Program	% of eligible costs covered by grant	Duration of Program	Criteria
Direct Grant Program	1978:up to 75% of capital costs 1984: 15-85% for pop < 7,500; up to 15% for pop > 7,500	1978-1993	To support development and construction of facilities for demonstrated health or environmental problems and/or growth.
LifeLines Program	33.3% of construction project costs	1987-1992	To support the rehabilitation of existing systems, based on age of pipes and structural degradation.
Municipal Assistance Program	Up to 70% for pop<15,000 Up to 18 1/3 % for pop bet. 15,000-20,000 Up to 15% for all municipalities	1993-1995	To support water and sewage infrastructure to promote health, environment, growth management, economic development, and water efficiency.
Provincial Water Protection Fund		1997-2000	To bring systems into compliance with the DWPR and to address health and environmental concerns.
COIW I	33.3% each cost-sharing amongst federal/provincial and municipal govts.	1994-95	To support employment generation and economic growth.
COIW II	33.3% each cost-sharing amongst federal/provincial and municipal govts.	1997	To address strategic infrastructure needs and priorities in transportation, healthcare, post-secondary education, and water and sewage works
COIP	33.3% each over all, with percentage per project to be determined on case-by-case basis	2001	To address strategic federal and provincial infrastructure needs and priorities.

In addition to provincial funding, the Federal Government re-entered the infrastructure funding business in 1994. The Federal and Provincial Government negotiated a cost sharing agreement called the *Canada-Ontario Infrastructure Works* (COIW) program. COIW I, a two-year program introduced in 1994, was integrated with provincial funding, providing funding for a range of infrastructure projects, including roads, water and sewer works, municipal buildings, education facilities, cultural and recreational facilities, and communications infrastructure. The Federal Government offered 33.3% funding for eligible projects. The object of the program was to accelerate economic recovery by generating employment. Eligibility criteria were based on a municipality's share of the total provincial population and households.

A subsequent COIW agreement was negotiated in 1997. COIW II also provided funding for a range of infrastructure, but the scope was significantly different. This second round was focused on more strategic funding, for the rehabilitation and repair of public facilities including transportation, healthcare, post-secondary education, and water and sewage works.

Most recently, the federal government and the Province negotiated *the Canada-Ontario Infrastructure Program*. Integrated with the province's existing SuperBuild funding programs, the COIP is focused on strategic investments in infrastructure, including water an sewage infrastructure. Specific percentages of funding have not been stipulated, though the overall funding under the program is meant to average out to a 1/3-1/3-1/3 cost sharing arrangement.

Implications of Decline in Funding

The reduction in senior government grants for municipal capital waterworks expenditures since 1996 suggests that the federal and provincial governments expect municipalities, or municipal rate payers, to bear a greater share of the capital costs for their waterworks. Unfortunately, in the short run, it has caused a decline in infrastructure funding of about 20% since 1995. This roughly corresponds to the average percentage of expenditures paid for by grants.

The suspension of ongoing funding support for waterworks infrastructure, in favour of short-term funding programs with changing criteria has lead to considerable confusion and frustration on the part of municipal officials applying for funding. Each new round of funding requires a reinterpretation of criteria, and a determination of their eligibility. New programs also often result in delays in the disbursement of funding, as the provincial approvals process adapts to new criteria. This delay aggravates the municipal planning and budget process, as has been illustrated most recently with the OSTAR funding process. Municipal councils deciding on their 2001 budget this Spring could not factor in whether they would be receiving provincial funding support for major capital works.

In response to the decline in sustained and predictable federal or provincial transfers, many municipalities have adapted by raising their water rates, relying more on debt, and deferring non-essential capital upgrades. As mentioned earlier, the net result has been a decline in sustained infrastructure investment, particularly in those municipalities that relied most heavily on provincial funding support in the past. This is particularly troubling for municipalities whose water infrastructure is reaching the end of its useful life.

The degree to which municipalities are able to establish financial arrangements that are sustainable in the long term, both to cover day-to-day operational costs and the massive costs of infrastructure replacement, varies across the province, and is explored in more detail in the next chapter.

Arguably, it is the unserviced municipalities that are most disadvantaged by this changing provincial-municipal financial relationship with regard to waterworks. While municipalities with established public water systems benefited from provincial grants in the past for the steep start up costs and rehabilitation costs, those that do not yet have extensive municipal water or sewage services will no longer have this support to draw on. This could serve as a disincentive to building new systems in unserviced areas in the foreseeable future. These areas will continue to rely on their private systems. However, the quality of the water in these private systems is coming under greater scrutiny, and the cost of maintaining some of these systems is becoming prohibitively expensive for private operators (see Box 2, DWPR).

3.4.3 Financing Practices in Ontario

The following detailed description of current financing arrangements sheds light on the implications of the shifting funding relationship and the sustainability of new financing arrangements.

Water system financing practices vary throughout Ontario, reflecting specific circumstances such as the evolution of municipal finance, the governance structure, and past financial support. Municipalities have a number of sources of revenue and employ additional financial instruments to pay for the construction, maintenance, expansion and replacement of their water infrastructure and for the operations and administration of their water distribution services.

The largest source of funding for the operations of water systems is from dedicated water rates charged to water consumers by municipalities. Water rates are usually set to cover year-to year, so-called 'cash' expenditures. Some municipalities may supplement this revenue with property tax revenue.

The capital costs of construction and upgrading water and sewage treatment facilities have typically been paid through municipal borrowing, reserves, transfers from other levels of government, general property taxes, and special charges (eg. a mill rate, or charges based on property hectarage or frontage). Growth-related service expansion is often paid for through revenue from development charges or payment by private developers as part of a package to support a new subdivision.

These various sources of funding have allowed each municipality to develop a financing system that reflects its particular financing capacity and requirements.

User Fees: Water Rates

Water rates are a form of user fee charged by the municipality to a residential, business or institutional water consumer.

Water rates vary significantly across the province. The difference in pricing often reflects the different characteristics of each system, such as the age of the system, the source of water, the type of treatment, the size of the service area, the population density being served, and the revenue generated from residential versus commercial /industrial customers. The variance in price also reflects different accounting practices to determine the cost of water (Renzetti, 1999) (see *Sec. 3.4.*4 *Asset Accounting*, below).

The fee may be calculated either as a flat or volumetric rate. A flat rate charge is the most common form of payment for residential service in Ontario, particularly in municipalities with a population of less than 100,000. The rate remains constant regardless of the volume of water consumed. The rate often varies depending on whether it is a residential or a commercial/industrial account, and sometimes varies depending on the type of residential dwelling.

In a 1999 survey of 56 municipalities that charge a flat rate for residential water service, rates ranged from a low of $7.15/month to a high of $50.00/month with a mean rate of $19 /month (Goodings, 1999).

Volume-based or metered charges reflect the amount of water consumed. Metered charges were more commonly applied to commercial and industrial users in the past. Increasingly, however, municipalities are investing in household meter installation programs to facilitate metered residential rates[17].

The metered rate is usually calculated based on average fixed costs incurred in system operation (including operation and maintenance and debt-retirement costs). The total water bill is then calculated by multiplying the rate by the level of water consumption per customer. This total amount reflects mostly fixed costs (ie. which must be paid regardless of the level of consumption). The difference in cost based on household consumption does not exceed about 20% of the total cost. This is due to the fact that largest share of costs in water treatment and delivery, such as operational and administrative costs and capital costs, are fixed. The only costs that rise with greater consumption are the cost of the increased energy consumption and the increase in the volume of chemicals used to treat the water.

A metered rate can be calculated as a constant rate, a declining rate, or an increasing block rate. The most common type of metered rate is a constant or single rate, whereby one price is charged per cubic meter of water consumed. The monthly cost is based on the volume consumed. An increasing number of municipalities with metered systems are charging a declining block rate, which is based on a standard charge and a volumetric charge which declines as consumption increases, based on blocks of consumption.

17 A recent Labour Relations Board decision requiring that only certified plumbers install water meters will likely add to the cost of programs to install meters in all municipal water customer households.

Typically, residential consumption would fall into the first block, and large industrial users would fall into the largest consumption block. An increasing block rate operates in the opposite direction, with larger water consumers being charged more per cubic meter than smaller water consumers, thus better reflecting the depletion of the resource.

In a 1999 survey of 160 municipalities, 79 municipalities or 49% had single rate metered charges, 68 municipalities or 43% had declining rate block charges, and 13 or 8 % have increasing rate block charges. It is notable that the number of municipalities reporting declining rate block charges increased from 29 in 1997 to 68 municipalities in 1999 (Goodings, 1999).

In addition to water rates, some municipalities raise added revenue through the collection of fees for hydrant maintenance from fire departments, and the installation of customer connections.

Federal and Provincial Grant Programs for Water Services

As explained earlier in this section, the Ontario Government has been financing, building and operating water treatment systems since 1956, and began providing financial assistance to municipalities for their waterworks in 1969. The Federal Government also provided grants to municipalities in the '60s and '70s.

Federal and provincial grants for waterworks infrastructure have reduced considerably in the last several years. As a result, municipalities are relying less and less on grants as a guaranteed source of financing for their capital works.

Other financial instruments

Debenturing or **debt financing**, refer to a method of recovering the net capital cost of a project from existing and future users. While debt financing has the advantages of paying back expenditures over a fixed period of time, the average debt term, that is, the repayment schedule, is usually significantly shorter than the life of the asset that is being paid for. While the life of a watermain may be 50-100 years, debt terms are rarely over 10 years. This means that a disproportionate share of the cost of the assets is being paid for by rate payers that use the asset over the first ten years, as compared to those rate payers benefiting from the assets over the subsequent 90 years. This issue is discussed at greater length in chapter 5.

Reserves refer to the practice by municipalities or PUCs to store a percentage of user fee revenue each year in a dedicated account that is set aside for future capital expenditures. Reserves may also be made up of undedicated general revenue, through which different types of capital costs may be paid, eg. waterworks, sewage works, roads, and bridges. If asset financing is planned in such a way that a fixed percentage of the value of the waterworks assets are stored each year from water rate revenue, this provides the most equitable allocation of costs to rate payers. This concept is discussed further in chapter 5.

Development charges are fees charged to land developers by municipalities that are based on a share of the capital cost of system expansion required for a proposed development, such as a subdivision or shopping mall. Ideally, development charges are meant to cover expansion costs due to development. While development charges can represent a significant source of revenue in areas that experience high growth, the revenue does not always cover all the costs of service expansion. In these situations, revenue from other sources, such as water rates, general property tax revenue, or grants, must supplement the development charges revenue.

Municipalities that do not benefit from much growth tend not to charge development charges, as they are considered a disincentive to the private sector to pursue development projects in low-growth municipalities.

A local area charge or local area rating is similar to a levy. It is only charged to those properties that benefit from a particular service from which the rest of the community does not benefit. Area rating has been used as a means to handle different service levels in amalgamated municipalities.

3.4.4 Asset Accounting

The way in which an asset like drinking water infrastructure is accounted for in budgets and other financial statements from year-to-year can affect on the way the infrastructure is maintained and financed.

Two different accounting approaches are currently used by municipal water operators – accrual or utility-based accounting and municipal cash-based accounting. The difference between the two accounting methods lies in how capital costs are valued. The cash-based accounting method records year-to-year actual cash expenditures as the measure of capital costs, ie. the payments of principal and interest costs on debt and contributions to capital reserves. Cash accounting is the predominant accounting methodology in Ontario.

Accrual accounting recognizes the depreciation of asset value over time, which can serve as an indicator of ongoing asset replacement requirements. Accrual accounting requires that depreciation in the value of assets is factored in to the rate calculations. Such an accounting approach is most commonly applied to utilities such as gas, hydro, and telephone. It is also used by water utilities in the U.S., Alberta and some Maritime provinces. In Alberta, the water service provider must go through a rates review hearing for approval to change rates just like other utilities do. While such an approach by no means guarantees better financing, it does provide a more accurate account of the ongoing costs by factoring in renewal costs.

Cash accounting simply reflects how much of the loan used to pay for capital costs has been paid off. This method can only reflect the actual value of the asset over time if the debt amortization period is similar to the asset life. With cash accounting, revenue is reported when it is received and expenses are reported as the bills are paid. The current budget includes revenues that are earned and expenses that are incurred over a given period. Expenditure items included in the cash basis that are not in the accrual basis are the capital portion of debt repayment, capital from current reserves and reserve funds. (OMWA&AWA, 1979 p. 2-10).

Accrual accounting's greatest benefit is that it provides a more accurate valuation of a municipality's assets. However, there is a drawback to accrual accounting. It can create a significant cash drain on municipalities with regard to assets which were debt financed, particularly if the assets are financed over a much shorter time period than their expected useful life- which is the norm. Once a municipality is far enough along in the repayment schedule to be paying down the principal, the annual principal repayments exceed the annual depreciation. A large cumulative cash drain results, compounded by the interest cost to carry the shortfall. The negative overall cash position is reversed only once the debt is retired. (Marshall, Koening, 1991)

Most municipalities adopted the cash-based accounting method because they are required to report to the Province on capital costs on that basis in their annual Financial Information Returns (FIR). However, the special acts creating two-tier government allow depreciation costs to be considered in fixing water rates. PUCs have the option of using either method. However, to integrate PUC accounts reporting with municipal account reporting to the Province, PUC must also adopt a cash-based accounting method.

As a result of these reporting requirements, historical capital costs and accumulated depreciation are not reported in municipal annual reporting to the Ministry of Municipal Affairs (Fortin & Mitchell, 1990).

The cash accounting system made sense when water system expansions were paid for with borrowed funds or grants from the federal or provincial government. However, its limitations are most obvious when considering full cost recovery. The true cost of a water service must factor in depreciation of the value of assets. The utility accounting system, which better reflects the state of the infrastructure, and the cost and timing of its rehabilitation and replacement, would serve to better inform municipal councils and PUCs in identifying financing requirements, underspending, and overspending.

3.5 Moving to Full Cost Recovery

There have been calls to move to full-cost recovery for public water services for many years. These calls were renewed following the water contamination tragedy in Walkerton, Ontario. Since then, the Provincial government has emphasized the need to move to full cost recovery.[18]

Moving to full-cost recovery was also advocated by the Who Does What Transportation and Utilities sub-panel, which concluded (Sancton, 2001)

> *After fulfilling its commitments under the existing provincial grant and loan programs, the province should terminate these programs and not issue new grants or loans…the concept of full-cost pricing and user fees – that includes charging against future replacement costs – is supported by the panel.*

[18] In response to a question on the availability of provincial funding for small municipalities that are not yet serviced by municipal water systems, former provincial Municipal Affairs Minister Tony Clement said, " We have to have full-cost prices so we have a system that's sustainable and the user is paying that full cost". (Calder, 2000)

Full cost pricing makes good sense for a number of reasons. First and foremost, if the full cost of the water service is recovered, it ensures sufficient and stable financing for the system into the future.

Secondly, if full cost recovery is based on level of consumption (ie. a metered system), water consumers would have the ability to reduce their water bill by reducing consumption, this promoting water conservation. If this water conservation results in overall reductions in peak consumption rates, it could result in reduced costs to the water operator, ie. if consumption is reduced to a level that eliminates the need to expand the capacity of the treatment plant.

Essentially, moving to full cost recovery would mean an end to senior government grants and subsidies for operational and capital expenditures associated with the delivery of water. A shift towards full-cost recovery, while it would have clear benefits as outlined above, would also have a number of implications.

First, if adopted as official government policy, full cost recovery would signal a fundamental shift in the provincial-municipal financing relationship over water infrastructure. By eliminating senior government grants, the federal and provincial governments' long standing role in promoting economic growth, and health and safety through infrastructure investment would come to an end.

Second, it would mean that a larger portion of public infrastructure costs would be paid for by households with after-tax dollars (ie. user fees). Under the grant system, a portion of these costs are paid for with pre-tax income tax revenue.

Third, moving to full cost recovery puts areas that are currently unserviced, but would like to construct a public water system, at a disadvantage to those municipalities with public water systems whose construction and expansion has been subsidized by provincial and federal grants.

Finally, for those municipalities that rely least on senior government grants, the transition to full cost recovery would be relatively smooth, although the resulting water rate increases may not be welcomed by all. For many smaller municipalities that rely much more on grants to cover their capital costs, or who have few customers on their water systems, however, there would likely be significant transition implications of full cost recovery. Depending on their short to medium term capital cost demands, moving to full cost recover could result in enormous water rate increases. For municipalities with residents on fixed or low incomes, or for systems with few customers amongst whom to spread the cost, these increases could prove prohibitively expensive.

3.6 Conclusion

Drinking water infrastructure is a capital-intensive business. It is costly to build, and it is even more costly to replace 50-100 years, later. Ontario is by no means alone in facing the dilemma of accumulating public infrastructure costs and decreasing public funding to match these costs.

Most municipalities rely on two sources of funding to pay for their water systems- user fees paid by water customers, and federal and provincial grants. In the face of declining levels of senior government grants, municipal investment in their water infrastructure has decreased in the last half decade. Based on very rough estimates, annual capital investment in waterworks may need to increase in the range of $200 million to $1.35 billion.

Moving to full-cost recovery would provide municipalities with the revenue necessary to invest in their waterworks. However, it would also result in significant increases in water rates. Municipalities that currently rely most heavily on grants, and those with the fewest water customers amongst whom to distribute the increased costs would be hardest hit.

4. CASE STUDIES

4.1 Introduction

Given the theory and general practices of municipal waterworks financing discussed in the last chapter, what can be said about the financial sustainability of these systems? While aggregate figures are useful, such a question can only be answered by examining systems at the local level. Four case studies of Ontario municipalities are presented in this chapter, to explore actual financing practices and to gauge the sustainability of these practices.

Each of the four Ontario municipalities was able to provide sufficient financial information to draw a 'thumbnail sketch' of the financial sustainability of their water systems. The information was collected and analyzed by Pricewaterhouse Coopers (PWC)[19].

4.2 Limitations and Qualifications

- PWC relied solely on the information supplied by the participating municipalities and have not undertaken an independent audit or verification of any information provided to PWC.

- Calculations and figures presented are for comparative purposes only. They should not be used for any other purpose without the prior consent of PWC.

- PWC made certain assumptions in analyzing the information provided to them, to develop a basis for comparison of municipal practices.

- Caution must be used in extrapolating the findings of the case studies survey, as the sample size is very small, and as such is not statistically significant.

- Given the short time frame that municipalities had to provide their financial information, PWC did not ask for comprehensive information. In particular, average annual capital expenditures are based on a ten-year average. Given the lifecycle of capital assets, such an average serves as a good guide, but does not provide the true cost of the assets. Similarly, estimated replacement values given for each system are based on certain assumptions of average costs, as well as the informed knowledge of municipal water staff. This figure is not as reliable as a comprehensive assessment.

[19] All figures quoted in this chapter are drawn from the report prepared by PWC for AMO, entitled, '*Water Service Financing and Practice Case Study Comparison'*. See Appendix A. Interpretation of these figures in this chapter is the responsibility of AMO/MEA & OGRA.

4.3 Case Study Municipalities (CSMs)

4.3.1 Case Study Selection

Each case study serves to illustrate how different types of municipalities financially manage their systems. For the purposes of this report, the municipalities will not be identified, but will be referred to as municipalities A-D. This anonymity is in recognition of the unverified and uncomprehensive nature of the data that was provided. There was not sufficient time to audit the data provided. Given the very public nature of the Walkerton Inquiry, it was felt that it was not appropriate to hold the municipalities to the figures that were provided. To get around the lack of auditing and comprehensiveness of the data, it was agreed that the CSMs would be presented without being specifically identified.

The case studies chosen are of municipalities whose systems serve between 3,000-26,000 customers. This provides a contrast between the smaller to medium sized systems, but does not include large systems, which generally have less of a challenge financing their systems, or the smallest systems, which face more of a challenge. An effort was made to choose municipalities in different parts of the province, and those with different management structures. This by no means illustrates the full diversity of municipal systems. Given the need for continuity and institutional memory, none of the four municipalities have amalgamated in recent years.

4.3.2 Background on CSMs

Four municipalities participated in the survey. All systems meet the requirement for filtration and disinfection. All systems provide water to fire protection services.

CSM A: a small, post-industrial northern municipality with a declining population. A significant portion of the distribution system is believed to be performing poorly and in need of rehabilitation and/or replacement. The treatment system is operated by OCWA. CSM A ‘s system serves the smallest customer base out of the four case studies.

CSM B: a small growing city, with an active industrial and tourism base. The treatment system has recently been replaced. The new treatment plant was co-funded with a neighbouring municipality and supplies a portion of its neighbour's water needs. Both the treatment and distribution systems are operated by the municipality.

CSM C: an upper-tier municipality with responsibility for delivering water services to a number of lower-tier municipalities. Both the treatment and distribution systems are operated by the municipality. CSM C services the largest number of customers, but through 9 smaller systems.

CSM D: a lower-tier municipality that purchases bulk water from an upper-tier regional government but is responsible for its water distribution system. CSM D has the largest single system out of the four case studies.

Table 4: CSM Characteristics

Case Study Municipality	CSM A	CSM B	CSM C	CSM D
Total Non-Seasonal Population	3,450	16,300	50,300	27,800
Service Population	3,400	16,000	25,800	21,700
Population Growth	None	2.1%	None	0.5%
Average Personal Income (Ontario Avg=$27,309)	$24,201	$28,431	$21,643	$22,614
Area(s) Serviced by Water System	Urban	Urban	Urban	Urban
Total Property Assessment	$152 M	$1.1B	$7.3 B	$1.6 B
Total Property Tax Revenue	$4.1 M	$26 M	$39 M	$34 M
Property Tax Water Levy (inc above)	_	_	$2.1 M	_
# of separate water systems	1	1	9	1
Tier	Single	single	Upper	Lower

4.3.3 Case Study Municipality A

Municipality characteristics

CSM A is a small, post-industrial northern municipality with a declining population. The population of the municipality is 3,450, with a population serviced by the municipal water system of 3,400. The service area is urban. There is currently zero annual population growth. The average personal income is $24, 201 (approximately $3,000 below the provincial average). The municipality has a total property assessment of $152 million, with total property tax revenue of $4.1 million.

Water System characteristics

The municipality is served by a single water system. The treatment system is operated by OCWA, and the distribution system is maintained by the municipality. Drawing from a surface water source, the treatment system meets all filtration and disinfection requirements.

It serves 1,625 household connections, 96 ICI customers, no bulk customers, and also serves fire protection services. Water accounts are not metered. The system produces 722,000 m^3 of water annually. The system has an estimated replacement value of $30 million.

The treatment plant is 13 years old. The median watermain age is 47 years, with the oldest watermains laid in 1947, and the newest in 1979. With an unaccounted-for water rate of 50%, a significant portion of the distribution system is performing poorly and in need of rehabilitation and/or replacement.

Cost of Providing Water Service

The estimated yearly cash cost per connection of providing water services is $486, representing $244 operating expenditures, $150 for debt servicing expenditures, and $92 for non-repayable[20] (grants or other non-debt sources) capital. The 10-year average for total capital is $132 per connection.

It is notable that CSM A's operating costs are the highest of the four CSMs, as a percentage of total annual cash costs. In other words, CSM A has proportionately higher operating costs. This may reflect the relatively low capital expenditures, or the relatively high cost of operating a system that is in disrepair. It may also reflect the poor operational economies of scale in a small system, as compared to larger systems.

Total capital expenditures per connection are relatively low, compared to the other systems. This largely reflects the fact that the capital cost is averaged over 10 years, and CSM A's largest capital cost, the replacement of its treatment system, occurred outside of this period, thirteen years ago. It may also reflect deferred replacement expenditures, ie. Required capital costs would be higher.

CSM A reported a significant operational cost impact due to the introduction of the new Drinking Water Protection Regulation last August. Meeting new testing and reporting requirements, instrumentation upgrades, and engineering services, is costing the municipality an additional $95,000 per year, representing a 23% increase in operational costs.

Paying for Water

CSM A reported that affordability is a key consideration when setting its water rate. The population is largely aging and on fixed incomes. Amongst residents, there is little practical distinction between property taxes and flat water fees. Municipal council considers the overall impact of water rates in combination with property taxes when considering rate approvals.

CSM A charges its residential customers a flat rate of $368/year, and an average monthly fee of $26.15 per month (includes residential and ICI). ICI customer rates vary, based on the number of employees. This results in the collection of $570,000 in user fee revenue per year. This covers 85% of annual cash costs (operating and debt service costs). Any shortfall is made up by reserve funds when necessary.

CSM A does not plan reserve contributions, but attempts to retain any excess cash from the yearly budget within the water utility accounts. These funds are not protected from other municipal uses, nor from non-capital water system uses. In general, CSM A tends to favour paying down debt rather than contributing to reserves. However, in 2000, the water budget surplus was used towards the 2001 water operating budget to reduce user fee increases.

[20] 'Non repayable capital' is a proxy for the average yearly new capital investment that is not debt-financed, which could not otherwise be determined from the information provided by the case study municipalities.

New capital costs are paid for through capital grants and new debt. Over the last ten years, approximately 70% of capital costs were met with grants, representing about 17% of total costs. CSM A has received capital grants consistently over the last ten years, except for the last two years. From 1991-1997, it received 82% funding for the capital works funding for which it applied.

However, in 1998, it received only 21% of the cost, and in 1999 and 2000, it received no funding. CSM A has recently made a $5 million OSTAR grant application to renew portions of its water distribution and sewer collection systems.

CSM A currently has no water system debt. Based on the annual repayment limit set by the Ministry of Municipal Affairs and Housing, it is estimated that the municipality's total debt limit is $5.1 million, of which 23% has already been used for other municipal capital expenditures. This suggests that CSM A has considerable debt capacity with which to pay for any outstanding capital expenditures. However, as debt servicing costs have impacted operations in the past, CSM A has endeavoured to pay off its debt and minimize its use of debt in the future.

General revenue is not used on a regular basis. However, CSM A has periodically used general property tax revenue to supplement user fee revenues and grant revenues when an operating deficit has developed. End of year excess cash from the water system budget has also been used at times to meet general municipal needs, and deficits that have required subsidy from general municipal funds have sometimes been made up through user fees in the following year.

CSM A does not levy development charges for growth related water infrastructure extentions.

Asset Management and Accounting

CSM A does not have a formal asset management system. It uses a 1-year capital plan horizon for renewal and replacement of its water system. It reports on its capital costs on a cash accounting basis, not on an accrual basis.

Financial Capacity

Using methodology A, based on grants received over the last ten years, the estimated annual renewal capital requirement was calculated as $610,000. In the absence of grants, user fees would have to be raised by 28 percent to cover these costs.

Using methodology B, it is estimated that the system’s total replacement value is $30 million. Assuming a 3.5% annual replacement rate, the estimated annual renewal capital requirement would be approximately $1.1 million. Since, in general, most capital investments in the past 10 years have been focused on upgrading rather than renewal and therefore further assuming that current user fees do not contain a substantial element for renewal, it is estimated that the impact would be a 184 % increase in current user fees. Using a 2% per annum replacement estimate, annual renewal capital requirement would be approximately $600,000, requiring a 100% user rate increase.

Box 3: Calculating a CSM's Financial Capacity

In the absence of a comprehensive assessment of the condition of, and value of water system assets, only proxy calculations can be made to make an informed judgement on each of the CSM's financial capacity to fund its water system.

PricewaterhouseCoopers employed two different methodologies to estimate the full cost of each system- one look at past costs, and one looking at possible future needs.

The first methodology (A) uses past capital expenditures as a proxy for future capital renewal costs. The average capital grants received by the CSMs over 10 years is used to calculate the long-term average renewal investment needs not covered by user fees. The methodology is essentially measuring how much the municipality would have had to have paid, had it not been for the grants it had received.

The second methodology (B) uses a thumbnail sketch of the total value of the system, using standard costs multiplied by kilometres of watermains and the cost of a new treatment plant. Then it is assumed that a municipality should invest 3.5 % of the total replacement value of the system each year, for renewal and upgrading of the infrastructure.

These approximations indicate that long term costs for the CSM A system may be higher than past expenditures indicate. If this is the case, CSM A will only have the capacity to fund water systems in the absence of grants, with a steep increase in the water rate, or the introduction of new revenue sources used for water services.

4.3.4 Case Study Municipality B

Municipality Characteristics

CSM B is a small growing city with an active industrial and tourism base. It is responsible for all components of water services. The serviced population is 16, 000, which covers almost the total non-seasonal population of 16,300. The municipality is currently experiencing an annual population growth of 2.1%. The average personal income is $28,431, which is roughly $1000 greater than the Ontario average. The municipal total property assessment is $1.1B. The property tax revenue of this single tier municipality is $26M.

Water System Characteristics

The municipality is served by a single water system. A public utilities commission is responsible for the extraction, treatment and distribution of water. A single surface water source is used to service the municipality. The water treatment system meets the filtration, disinfection, and fire protection requirements. 6,650 residential customers and

555 ICI customers, all of which are metered, are connected to the water system through 125 km of watermains. Since the treatment plant was co-funded by a neighbouring municipality, a portion of water goes towards this bulk customer. The system produces 7,250m^3 of water a year and is valued at $95M.

The treatment plant is two years old, while the watermains are an average of 25 years and remain in good condition. The oldest watermain is 90 years old, and the newest one is 1 year old. Unaccounted for water (either leaked or un-metered uses) amounts to 20%.

Cost of Providing Water Services

CSM B uses accrual accounting for the water system. The estimated yearly cost per connection includes:

Operating Expenditures	$157
Debt Servicing Expenditures	$147
Non-Repayable Capital	$147

The total estimated cash cost of providing water services per connection is therefore $451. The ten year average for capital costs per connection is $343.

Although CSM B has recently constructed a new water treatment plant the capital cost per connection are considerably less than for CSM C. Operating expenditures are also lower as compared to CSM C, perhaps reflecting a greater density of population.

The impacts of the new drinking water protection regulation, which places additional requirements on municipalities supplying drinking water, are expected to be minor for CSM B as the new water treatment plant and procedures already met most of the requirements.

Paying for Water

Total user fee revenue amounts to $2.7M annually. User fees recover 100% of the operating and debt service costs and 28% of the new capital expenditures. The new capital cost shortfall is made up for through capital grants, debt, and reserves. CMS B sets rates with the goal of covering short-term cash expenditures (yearly budgeted costs). The estimated average water bill per residential connection is $18.44 per month. Other sources of water funding include customer user fees, reserve funds, grants, debt and development charges.

CSM B uses a two-part, constant block rate with a seasonal increase block rate. The capacity charge is based on the size of the service connection, from $13 (residential) to $260 (large industrial) per month. From September to April the consumption charge is $0.40/$m^3$, from May to August the charge is 0.40m^3$ plus $0.58/$m^3$ for above average consumption.

CMS B favours paying down debt rather than contributing to reserves, but will build reserves as debt balance is reduced. Over the last 10 years the percentage of capital costs met with grants was 43%. This amounts to 27% of the total costs.

CSM B currently has a $12M dollar water system debt, or $1,666 per connection. The water system debt term is 15-20 years, while the average asset life is 40 years. The estimated debt limit is $35M (15 year term). Sixty-seven percent of this debt capacity has been used.

CSM B levies development cost charges against new developments. These development charges and/or local area charges are sufficient to extend water services to newly serviced parcels.

Pending capital projects include expanding the reservoir capacity. This is expected to be paid for through water rate revenue.

Asset Management Accounting

CSM B uses a five-year planning horizon for its water system.

Financial Capacity

Assuming that the average capital grants received by the CSM B over the past 10 years are indicative of the long-term average renewal investment needs and that these needs will be recovered through user fees, the average user fee increase would be 40%. The estimated renewal capital requirement would be $1.1M.

CSM B has estimated the total replacement value of its system to be $95 million. Assuming that 2% of the system replacement value should be invested in major maintenance and renewal on a yearly basis, the estimated annual renewal capital requirement would be $1.9 million, requiring an average increase in user fees of 70%. Using a 2% annual renewal rate, the estimated annual renewal capital requirement would be $3.3 million, requiring a user fee increase of 120%.

4.3.5 Case Study Municipality C

Municipal Characteristics

CSM C is an upper-tier municipality responsible for delivering water service across a large area. It operates nine separate community water systems, servicing an average of 2, 900 people per system. The areas serviced by the water system are urban. The non-seasonal population is 50,300, but the population serviced by the municipal water system is 25,800. There is currently zero population growth. The average personal income of the residents is $21,643, approximately $5,000 below the Ontario average. The total property assessment amounts to $7.3 billion, while total property tax revenue amount to $39 million. The property tax water levy, which is included in the previously stated taxes, is $2.1 million.

Pending capital projects involve getting water supply to smaller communities. There is also contaminated or inconsistent supply in built-up areas.

Water System Characteristics

CSM C is responsible for the extraction, treatment and distribution of water. This water is taken from 8 surface water sources and 1 ground water source. The treatment system meets all of the filtration, disinfection and fire protection requirements. There are 8,603 residents customer connections, 90% of which are metered, and 1,044 ICI customer connections, 10% of which are metered. 4,446,000 m^3 of water is produced or purchased each year.

The treatment plants are 1 - 20 years old, and watermains are between 1- 50 years old, with an estimated average age of 20 years. The water mains remain in good condition. However, 18% the water is unaccounted for through leakage and un-metered uses.

Cost of Providing Water Services

The estimated yearly cash cost per connection of providing water services is $1,132. This figure is the sum a $262 operating expenditure, $481 debt servicing expenditure and $389 non-repayable capital. The total capital average over ten years is $548 per connection.

CSM C's relatively high yearly cost reflects the recent construction of several water treatment plants in small communities. These small plants can therefore benefit less from economies of scale.

Due to the introduction of the Drinking Water Protection Act, CSM C anticipates additional costs of $200,000, representing an 8% increase in annual operating expenditures.

Paying For Water

CSM C charges its water rates using a one-part constant block rate. There is a $0.586m3 consumption charge. The revenues from user fees totals $2.9 million. If the property tax water levy revenues are included as "fee" revenue then this figure increases to $4.9 million. The operating and debt servicing cost recovered by user fees is 46%, or 79% including property tax water levy revenues. The operating and debt servicing cost shortfall is made-up by additional fees such as hydrant charges and connection charges. CSM C does not have any new capital expenditures being covered by user fees. The new capital cost shortfall is made up by capital grants and debt. Total cost recovery through user fees is therefore 23%, or 40% including property tax water levy revenues.

CSM C has benefited from a consistent stream of provincial grants, from 1991 through to 1999. No funding was received in 2000.

CSM C's property tax levy is charged only to land owners in the urban area that benefit from water services, and is similar to a capacity charge. The other water related fees charged by CSM C, such as hydrant maintenance and local improvement fees, are not included in "user-fees", but can be a significant source of revenue. These fees are sufficient for CSM C to recover its operating and debt servicing expenditure.

Based on residential water rate revenues reported, the estimated average monthly water bill per residential connection in CSM C is $37.37 per month. The most significant sources of revenues for funding water services in CSM C user fees followed by capital grants. Reserve funds, property tax water levy, debt and development charges are also used.

The average reserve fund end of year balance for the past ten years is $980,889. This trend is increasing. The reserve balance / average operating and debt servicing costs are 17%. The reserve balance per connection is $102, while the reserve balance per kilometre of water main is $2,885.

CSM C builds reserve funds for short-term use as a water system budget line item based on a ten-year capital budget. This creates a source of funds that can be employed as renewal and replacement needs arise. CSM C also has a "pollution control fund" that may form the basis for a reserve that is focused on longer-term capital needs. Over the last ten years 71% grants received from higher levels of government have been used for capital costs. While 36% of total costs were met with grants.

CSM C's current water system debt amounts to $11.2 million, or $3,369 per connection, while the total municipal debt is $32.5 million. The water system debt term is 10-20 years, while the average asset life is 40 years. With an estimated debt limit of $64 million, 51% of the debt capacity is used.

CSM C levies development charges against new development, though these charges do not fully capture the costs of servicing new lots.

Asset Management and Accounting

CSM C uses a 10-year capital planning horizon for renewal and replacement of its water system.

Financial Capacity

Assuming that the average capital grants received by CSM C over the past 10 years are indicative of the long-term average renewal investment needs and that these needs will be recovered through user fees, the average user fee increase required would be 76% (in the absence of grants).

Based on the estimated infrastructure replacement cost of $284 million, a 2% annual replacement investment would be $5.7 million, requiring an increase in user fees of 116%. A 3.5% annual replacement investment would be $10 million, requiring an user fee increase of 196%.

4.3.6 Case Study Municipality D

Municipal Characteristics

CSM D is a lower-tier municipality that purchases bulk water from an upper tier regional government and is directly responsible for water distribution only. The total non-seasonal population is 27, 800 and the population in the urban area with municipal water service is 21,700. The population is increasing at an annual rate of 0.5%. The average personal income is $22, 614, approximately $4,000 less than the provincial average. The total property assessment is $1.6 billion and total property tax revenue amount to $34 million.

Water System Characteristics

CSM D is only responsible for the distribution of water, which is taken from 1 surface water source. The treatment system meets all of the filtration, disinfection and fire protection requirements. The treatment plant is 25 years old, and watermains are 2-100 years old, and the newest are 2 years old, with an estimated average watermain age of 20-40 years. The average water main age is 34 years. The 258 kilometres of watermains remain in good condition.

There are 10,500 residential customer connections, all of which are metered. The 900 ICI customer connection are also all metered. Five thousand cubic metres of water is produced or purchased per year. Twenty-three percent of this water is unaccounted for through leakages or un-metered uses. The estimated replacement cost of the facility or total water infrastructure is $15.5 million. This figure rises to $48.6 million if the upper tier municipality infrastructure that services CSM D is included.

Pending 'renewal' capital projects include the replacement of an old cast iron watermain to eliminate coloured water and improve chlorine residuals. It is anticipated that these will be funded through the water rate, gaming revenues and debentures.

Cost of Providing Water Services

The estimated yearly cash cost per connection of providing water services is $384 (both tier). Lower tier operating expenditures total $79, and combined with upper tier operational costs, total $166. Their combined debt servicing expenditure amounts to $35 and there is zero non-repayable capital. The total capital average over ten years is $183 ($131 lower, $52 upper tier). The annual operating expenditures are expected to increase by $75,000 (3%) as a result of the introduction of the Drinking Water Protection Act.

Paying For Water

CSM D charges its water rates using a two-part constant block rate. The capacity charges are based on size of service connection and range from $11 (residential) to $460 (large industrial) per month. The municipality has a $0.54/$m^3$ consumption charge.

The total user fees revenue is $3.6 million. The operating and debt servicing cost recovered by user fees is 100%. Therefore no operating and debt servicing cost shortfall exists. CSM D recovery 62% of new capital expenditures through user fees. The new capital cost shortfall is made up by general revenue and debt. Total cost recovery through user fees is 82%.

CSM D receives considerable gaming revenue each year. For the past four years, an estimated $1 million of this general revenue source has been invested in water distribution system renewal. This revenue is not dedicated to water system uses, and therefore may be reallocated to other municipal needs.

Based on residential water rate revenues reported the estimated average monthly water bill per residential connection in CSM D is $26.41 per month. CSM D employs user fees, reserve funds, debt deferred investment and development charges as sources of revenue for funding water services.

User fees comprise 60 to 70 percent of the revenue received by the CSM for water system use. The remainder is largely gaming revenue.

The average reserve fund end of year balance for the past 10 year is $422,774 and is increasing. The reserve balance is 19% of average operating and debt servicing costs, or $ 37 per connection. The balance per water main is $1,639/km.

CSM D contributes to reserve funds using surplus funds from capital projects. It also targets a reserve balance equivalent to a typical year of capital spending. The municipality has used reserves against operating expenses to moderate user fees.

Grants are not a part of CSM D revenues. Instead gaming revenues have been used to allow the municipality to catch up on previously deferred investment in water main renewal. The water system competes with other municipal priorities for access to this revenue sources.

CSM D's current water system debt amounts to $1.9 million, or $166 per connection. The water system debt term is 10 years, while the average asset life is 40 years. The estimated debt limit is $19 million and 32% of the debt capacity has been used.

Asset Management and Accounting

CSM D uses a 20-year capital plan for renewal and replacement of its water system.

Financial Capacity

Assuming that the average capital grants received by the CSM D over the past 10 years are indicative of the long-term average renewal investment needs and that these needs will be recovered through user fees only, the average user fee increase required would be 25%. The estimated renewal capital requirement would be $0.9 million. However, if gaming revenue continued to be used at the same rate as the last several years, no increase would be necessary.

With an estimated replacement value of $64 million (upper and lower tier assets), and assuming that 2% percent of the system's replacement value should be invested in major maintenance and renewal on a yearly basis, and that this would be recovered through user fees alone, annual investment costs would be $1.3 million, requiring a 36% increase in user fees. Assuming a 3.5% annual investment rate, $2.2 million, requiring a 61% increase in fees.

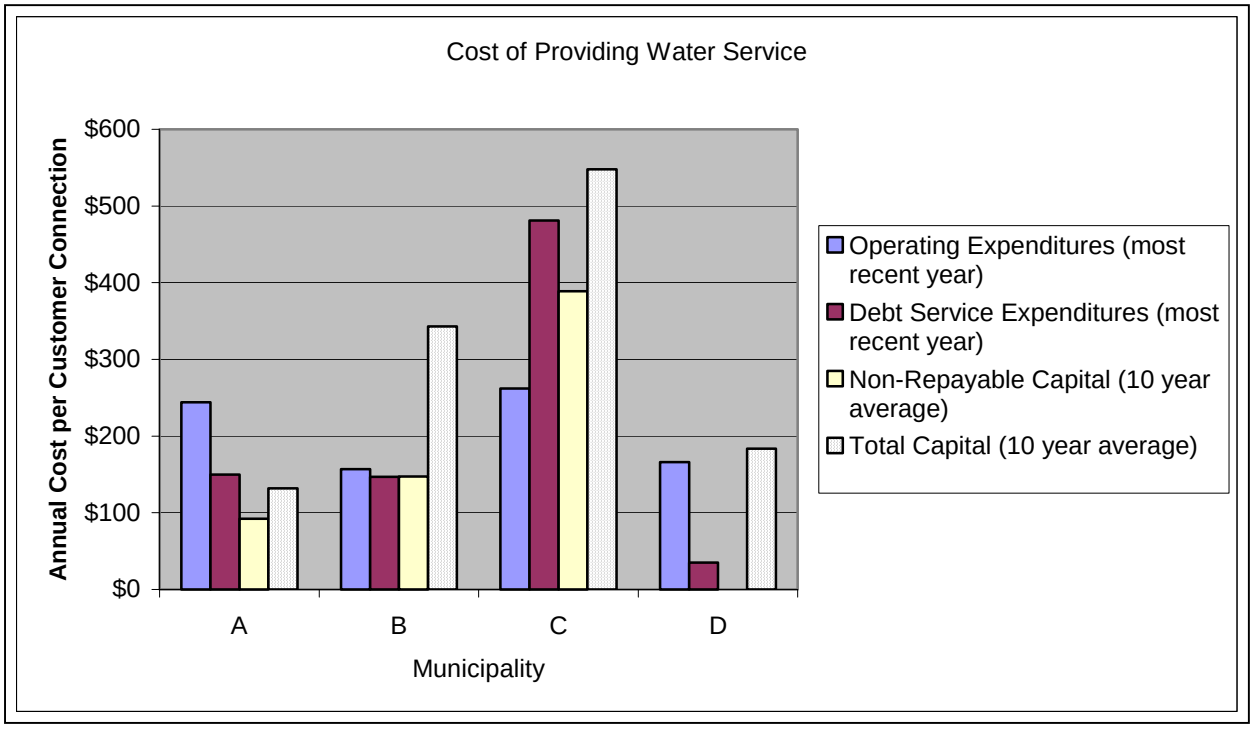
4.4 Comparative Observations

4.4.1 What costs are municipalities facing?

As can be seen in Figure 4, below, both operational and capital expenditures from CSM to CSM vary considerably.

Looking at the number of people served, and the capacity of the systems, CSM C and D seem to be the most comparable. However, CSM C's total capital costs are 3 times as high as those of CSM D. With the number of people served by the system, about 26,000, one would expect it to benefit from economies of scale, thus reducing the per connection cost. However, as CSM C's system is actually a series of nine small systems, it is more comparable to the size of CSM A's system, serving around 3,000 customers each and each system with similar capacity (around 700,000 m3 per year). This comparison bears out in that CSM A and CSM C's operational costs are fairly close. However, CSM C's capital costs are much higher than any of the other three CSMs. This may reflect the *diseconomies* of scale inherent in a widespread, multi-system network as compared to a single system serving the same number of people. Capital expenditures for 9 systems, regardless of the number of customers served, are much higher than capital expenditures for a single system.

Figure 4: Cost of Providing Water Services



CSM B and CSM D, which serve comparable populations, 16,000 and 21,700 customers respectively, have the most comparable operational ($157 v. $166) and total capital costs ($204 v. $183). However, CSM D's debt servicing level and non-repayable capital are significantly lower. This reflects in part CSM D's advantage in having a supplementary revenue source, gaming revenue, which has allowed the municipality to invest $1 million per year for the last four years in water infrastructure, without accumulating debt or relying on grants.

Some of the variation in past and pending capital costs reflects the comparative age of the systems and the timing of capital upgrades or replacements in the past. For example, CSMs B and C have recently replaced their treatment plants.

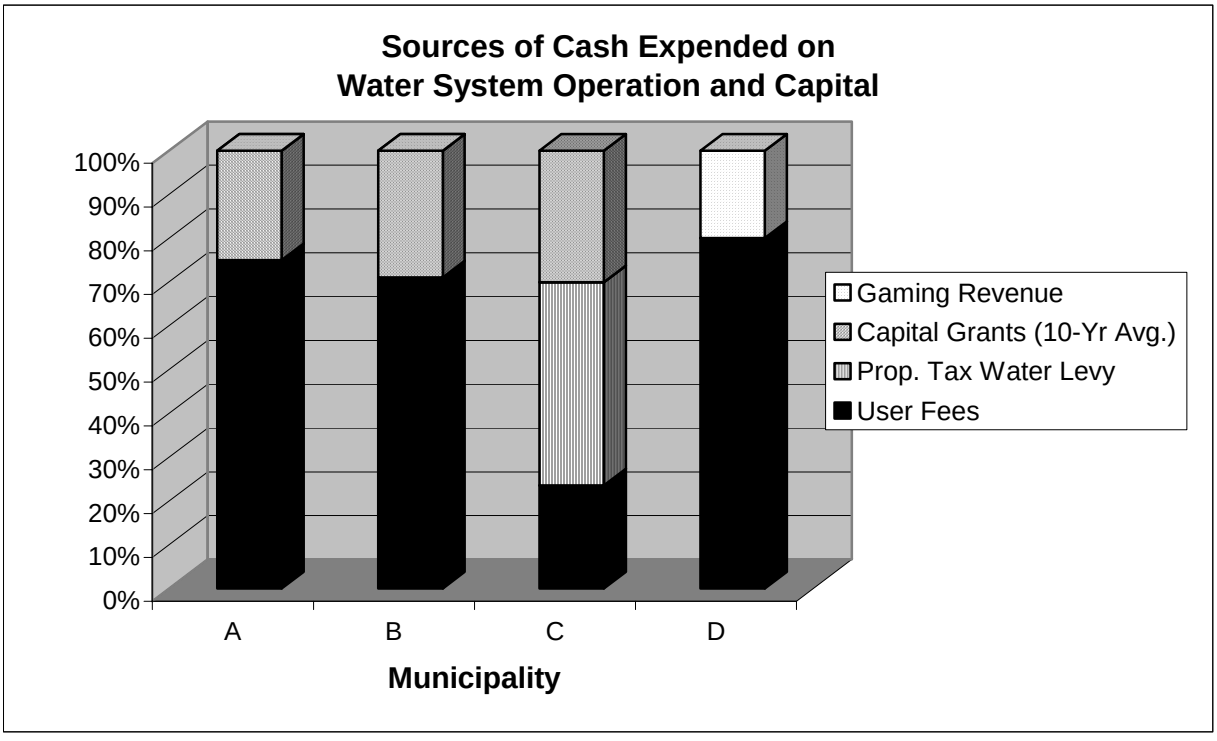
4.4.2 How has the new Drinking Water Protection Regulation impacted the CSMs?

Three of the four CSMs indicated that the new provincial Drinking Water Protection Regulation has placed additional operational requirements, and therefore costs, on municipalities supplying drinking water.

Additional operational costs are resulting from:

- More frequent and increased range of water quality testing and reporting and staffing to perform tests and produce reports;
- Immediate instrumentation upgrades at water treatment plants; and
- Engineering services to prepare the mandatory 'Engineer's Reports' every three years.

Figure 5: Sources of Cash for Total Water System Costs



As a result, the following operating expenditure increases are anticipated in each of the CSMs:
CSM A: $95,000, representing a 23% increase in operating expenditures
CSM B: minimal impact
CSM C: $200,000, an 8 % increase in operating expenditures
CSM D: $75,000, a 3 % increase in operating expenditures

The increase in cost for CSM A may reflects the difference between the level of testing and reporting that used to be required under their plant's certificate of approval vs. the new standardized requirements. CSM B is feeling a minimal impact, as its new water treatment plant and procedures were nearly meeting the new requirements already. In CSM C, the increased cost reflects the fact that the new testing costs are multiplied by 9, due to the number of systems. And in CSM D, costs associated with new testing, quarterly reporting and engineer's reports are distributed over a larger number of customers at the upper tier level.

4.4.3 How do they manage and account for the value of their assets?

Three of the four CSMs use cash-accounting rather than accrual accounting for water system capital assets. One CSM uses accrual accounting. No formal asset management system is used by any of the four CSMs. Rather, the CSMs rely on capital planning, with planning horizons varying in length from 1-20 years.

When asked about its asset management/maintenance strategy, CSM A replied, " Fix it when it breaks". CSM D (upper tier) is moving towards a fixed asset accounting module in the coming year.

4.4.4 How have CSMs paid for their systems in the past?

In each of the case studies, water rates represent by far the most significant source of funding for water services, averaging about 70% of total costs over the last ten years for those three CSMs that received grants.

The source of revenue for operational expenditures is consistent across the four municipalities - user fees cover 100% of operational costs, with some year to year exceptions for CSM A.
Capital costs were covered through a varying combination of debt, reserves, and grants. CSM
D is the exception, as it relies on no grants, but rather own gaming revenue.

None of the CSMs uses property taxes as a regular source of funding for either capital or operational expenditures.

4.4.5 How are water rates set?

The water rates of the four CSMs are difficult to compare as they are based on different calculations. CSM A has a flat rate, whereas CSMs B and D are consumption based, with different types of consumption charges, and CSM C uses a property tax water levy and a consumption charge. And each municipality has different percentage of ICI customers. However, estimates of average monthly residential water bills show a spread in rates of nearly $19, with CSM B at the lowest rate of $18.44, CSMs A and D in the middle at $26.15 and $26.41 respectively, and CSM C the highest at $37.37.

Of the CSMs that receive grants, CSMs A and C set rates to cover total current costs, including operating expenditures and annual debt service expenditures, while CSM B also recovers 28% of its new capital expenditures through its user fees. CSM D recovers 62% of its new capital expenditures through its user fees, representing the closest to full-cost recovery of the four.

To the extent that user fees pay annual debt service payments, these fees also cover a portion of past capital expenditures.

4.4.6 To what extent have the CSMs relied on grants?

Three of the CSMs use federal or provincial grants to pay for a share of capital costs. CSM D is the exception. It has not used capital grants to cover any of its capital expenditures over the last ten years. Additional revenue from gaming activities has been invested in water infrastructure over the last four years.

Table 5: Share of Waterworks Costs paid for by Grants Received by CSMs over Last Ten Years

	Municipality A	**Municipality B**	**Municipality C**	**Municipality D**
Operating Costs met with grants	0%	0%	0%	0%
Capital Costs met with Grants	70%	43%	71%	0%
Total Costs met with grants	17%	27%	34%	0%

Two CSMs, A & C, have relied heavily on grants, covering 70% and 71% of their capital costs respectively. CSM C has relied less on grants, covering only 43% of capital costs, and more on its user fee revenue, reflecting a more full cost recovery model of financing.

4.4.7 To what extent have municipalities used borrowed funds?

All four of the CSMs use debt to pay a share of their capital costs. User fees generally pay for debt servicing payments over the term of the debt. Debt terms range from 10 to 20 years. The longer the debt term, and the higher the number of water customers, the lower the debt repayment burden in water rates per customer.

Debt servicing expenditures vary widely, according to the timing and magnitude of past investments, the rate of repayment, terms, and interest rates. Those municipalities that have recently paid for major upgrades with debt financing have the highest debt levels.

Not surprisingly, the two municipalities that have most recently undertaken significant capital projects have the highest current debt level.

CSM B currently owes the largest share of water system debt as a percentage of total debt capacity available. The municipality has used approximately 70% of its total debt capacity, 50% of which is water debt ($12 million). This is a sizable amount of the debt, given that it is competing with other capital intensive expenditures, such as roads and sewage. Its water system debt per connection is fairly high, at $1,666.

CSM C has a similar level of water system debt outstanding, at $11.2 million. This represents about one third of the total outstanding debt, but only about 17% of total debt capacity available. However, the municipality's debt capacity is deceptive, as only about half the residents in the municipality are serviced by the municipal water system. So while the municipality is far from maximizing its debt use, increasing the amount of water debt would impose a significant debt repayment burden on water customers.

CSM A reported that it has deliberately minimized its use of water system debt as debt service costs have impacted operations in the past. It currently has no water system debt. This likely reflects the fact that CSM A has a relatively low number of customers, (3,450), so the distribution of the debt burden in water rates is relatively high per customer.

4.4.8 To what extent have these municipalities used reserve funds?

All but one, CSM B, use their reserves to pay for short term capital costs. Reserve funds are also used for operating costs on occasion, when there is a shortfall at the end of the year.

CSM A, with its short capital plan horizon (1 year), does not have a dedicated reserve fund, and does not plan contributions, but tries to retain any surplus from its water budget. It used some of its water budget surplus from last year towards its 2001 operating costs that have increased considerably, in order to reduce the necessary user fee increase.

CSM B does not build up reserves so long as it has significant debt. Any surplus is put towards paying down the debt. Once the debt is reduced, it then considers building short term reserves.

CSM C and D, each with longer capital planning horizons than either CSM A or B, build their reserve funds to pay for anticipated capital costs. CSM C, with the highest dedicated reserve funds per km of watermain, uses dedicated short-term reserves for replacement and renewal costs. CSM D, with a 20-year capital plan horizon, targets a reserve balance equivalent to a typical year of capital spending.

4.4.9 Are the CSMs' water systems financially sustainable into the future?

As we have seen above, the extent to which each of the CSMs relies on senior government grants to supplement user fees, or uses municipal debt capacity or reserve funds, to finance its water system over time, varies widely, even in such a small sample.

Assuming that municipalities continue to receive senior government grants, and continue to raise rates moderately as operating costs and debt servicing costs increase, then three of the four municipalities seem to be in good financial shape. One exception may be CSM A. Given the age and poor condition of its distribution system, it may require a significant injection of funding to replace or rehabilitate its watermains.

However, if it is assumed that senior government grants will continue to decline, or be phased-out altogether, then the question must be posed somewhat differently. Without grants, the current level of user fees or water levies alone are not sufficient to fund historical levels of capital investment in 3 of the four CSMs, the exception being CSM D, which has an alternate source of revenue from gaming activities. In the absence of grants, what would it take to move to full cost recovery or another model of financial sustainability?

As cash costs are already covered by water rates, the focus to determine financial sustainability must be on capital costs. In the absence of a full assessment of the value of each CSM's assets, PricewaterhouseCoopers employed two different methods of analysis.

The first methodology uses previous capital expenditures as a proxy for future capital renewal costs. The average capital grants received by the CSMs over 10 years is used to calculate the long-term average renewal investment needs not covered by user fees.

The second methodology uses a thumbnail sketch of the total value of the system, using standard costs multiplied by km of watermains and the cost of a new treatment plant.

It is then assumed that either 2% or 3.5% of the system replacement value should be invested in major maintenance and renewal each year. The 2% figure has been used in the past and is based on replacement costs only, assuming the average useful life of infrastructure is 50 years. The 3.5% figure has been used most recently by the City of Hamilton in its estimates of needed infrastructure investment, factoring all aspects of infrastructure costs, such as renewal costs, expansion and upgrades. It is further assumed that user fees do not address any portion of renewal capital needs. (which is not currently the case, as a percentage of water rates covers capital debt repayment).

It must be noted that PWC characterizes these as 'coarse assumptions that provide indications only' of estimates of increases in user fees to achieve full cost-recovery.

The methods apply identical assumptions across all CSMs that do not take into account differences in asset condition and current investment in renewal.

Table 6: Estimated Required Increases on Current Rates

	CSM A	CSM B	CSM C	CSM D
Method 1	28%	40%	76%	25%
Method 2 a: 2% renewal costs per year	100%	70%	116%	36%
Method 2 b: 3.5% renewal costs per year	184 %	120%	196 %	61%

The calculations above provide estimates that are at either end of the 'plus or minus' spectrum. For instance, if any of the municipalities have been deferring necessary capital projects over the last ten years, then the average capital cost will be somewhat lower than it should be. This would make Method 1 produce slight underestimates. On the other hand, if municipalities pay a portion of their user fees towards debt service payments, then the assumption that current user fees do not address any portion of renewal capital needs is wrong. Therefore, Method 2 will produce a fairly significant overestimate.

With these caveats in mind, these numbers do suggest that CSMs A, and C are most vulnerable to grant reductions or phase-out. Using either method, CSM C would face the stiffest increase in user fees to reach financial sustainability. CSM D would be the least impact from a phase-out of grants, as it does not rely on them. The impacts described above would likely be fairly absorbable through a combination of user fee increases and the continued use of gaming revenue.

4.5 Conclusion

The four case study municipalities presented in this chapter illustrate the diversity in system characteristics, in their financial management practices and financial capacity. Even within such a small sample, major differences are evident. In reality, the diversity is more extreme, with systems that serve dozens of people in villages, to systems that serve millions in mega-cities.

Each of the case study municipalities relies most on user fees to finance its water systems. Typically, user fees cover the operational costs of the system, as well as a share of capital costs, paid for as debt repayments each year.

The extent to which municipalities rely on grants to make up for the remaining capital costs varies considerably. Among the case studies, it was those that had another source of municipal revenue, gaming revenue, and those with higher customer numbers on each system that relied less on grants.

Those municipalities that relied more heavily on grants were those with fewer customers. This reflects the diseconomies of scale that can result from a low customer per system ratio.

The use of debt and reserve funds also varied. As debt must be paid back through user fees, a major concern for municipalities with fewer customers on each system was to be mindful of overburdening the customers with the debt repayment costs.

Clearly, systems with different characteristics need different financing strategies, and would experience very different impacts from a phase-out of grants and a move to full-cost recovery.

5. STRENGTHENING MUNICIPAL FINANCIAL CAPACITY FOR WATER SERVICES

5.1 Introduction

There is clearly a need for an increase in waterworks infrastructure spending. As shown in Chapter 3, it is evident that spending on infrastructure has been through ups and downs over the last ten years. If the case study municipalities are any indication, these investments have been influenced by the availability of grants and short term planning, rather than an assessment of the long- term infrastructure renewal costs of each system.

A more systematic, comprehensive assessment of waterworks infrastructure needs is required. If rough estimates discussed in Chapter 3 are in the right ballpark, current annual levels of water infrastructure investment are indeed falling short.

The need for more dedicated, sustained investment in waterworks infrastructure is indisputable. Nevertheless, the most difficult questions remain unanswered. How are we collectively to bridge the infrastructure investment gap? What sources of financing are available to us? Will some municipalities need more help than others?

Ultimately, any recommendations to strengthen the financial sustainability of drinking water systems in Ontario must reflect the diversity of systems, and must allow for flexibility to develop and implement plans that reflect the unique system characteristics in each municipality.

In this chapter, a number of strategies to strengthen the municipal financial capacity for water services are considered, including comprehensive asset management planning, reducing the cost of water services, providing municipalities with more appropriate finance management options, and bridging the remaining infrastructure financing gap with new or increased sources of financing. For some water systems that suffer from 'dis-economies of scale', even improvements in all these areas may not be sufficient to make their systems financially sustainable in the absence of senior government assistance.

5.2 Asset Management and Sustained Investment

As the case studies in Chapter 4 illustrate, many municipalities operate their water systems using a fairly short planning horizon. As explained in chapter 3, infrastructure costs are lumpy, making long-term financing somewhat of a challenge. So long as provincial grants were available to share the load, municipalities were able to use these to meet these lumpy costs at critical points in the life of the infrastructure. With the reduction and possible phase-out of senior government grants for infrastructure, municipalities are under pressure to adapt their financing strategies accordingly. This will require that they plan for the long term, by employing financing tools that allow them to pay for costs over the full lifecycle of infrastructure, from construction, through maintenance and rehabilitation, to replacement.

In order to move towards more long –term finance management, municipalities will need a clear idea of the full replacement cost of their systems. Currently, water systems suffer from an absence of comprehensive data on their asset value and condition.

A comprehensive assessment of the value and condition of all municipal water systems as proposed by SuperBuild[21] would assist enormously in gauging the extent to which municipalities must strengthen the financial sustainability of their water systems. With an informed estimate of the replacement cost of each system, municipalities will be able to anticipate and plan for costs well into the future.

In 1999, the US introduced a requirement for state and local governments to account for their capital infrastructure assets and provide an annual report. The GASB Statement No. 34 is meant to improve the reporting of public accounts. In Australia, utilities must develop comprehensive asset management plans to demonstrate full cost recovery and infrastructure sustainability (Powell, 2000).

Ontario municipalities will need to move towards developing formalized asset management plans that prepare them for financing and planning for the full life-cycle of their assets. Provincial assistance, in terms of developing generic methodology, and perhaps in terms of offering incentives to municipalities to develop these formalized asset management plans, should be considered.

5.3 Accounting for Asset Value over Time

The way in which accounting practices in Ontario municipalities have evolved, their assets are recorded on balance sheets in terms of the debt that remains to be repaid on those assets. The depreciating value of water infrastructure assets are therefore not recorded as part of most municipal accounting practices.

Accrual accounting, or utility accounting, introduces the notion of the declining value of assets on to municipal balance sheets. Depreciation of assets is recorded as an in-year expenditure (Marshall, Koenig, 1991. p. 68).

Accrual accounting does not in and of itself generate the capital needed for future replacement works, but it does keep municipalities better informed of the true value of its assets. As explained in a report prepared for the Ministry of Municipal Affairs, " *While these is no doubt that the rigour of valuing the assets (which is introduced with the use of utility accounting) is a fundamental requirement if municipalities are to effectively plan for the replacement of the sewer and water infrastructure, it would appear that changes to accounting practices are of secondary importance…significant amounts of money are required to address the infrastructure replacement program."* (Marshall, Koenig,1991. p. 71.)

As noted in Sec. 3.4.4, accrual accounting's greatest benefit is that it provides a more accurate valuation of a municipality's assets over time. However, if debt amortization periods do not match the life of the assets, as is usually the case, basing rates on the depreciating value of the assets can create a significant cash drain. Municipalities could find themselves in a position where they do not have enough revenue to pay their debt

[21] SuperBuild Corporation has commissioned a series of studies, including an inventory of the condition of municipal water systems.

payments. Some reconciliation between the depreciation of asset value on the one hand, and the need to pay down debt on the other is therefore required.

5.4 Measures to reduce costs

In addition to orienting their financing strategies towards long-term renewal costs, municipal waterworks operators should fully explore options to reduce costs as a way to strengthen their financial capacity. Cost-reducing efficiencies can be created through a wide range of organizational, financial, and engineering means. Many municipalities have already adopted some or all of these cost-saving strategies, with good results.

5.4.1 Economies of Scale

One common cost-saving strategy is to seek savings by creating economies-of-scale. Such savings may be found through bulk purchasing of materials, purchasing water from an adjacent municipality, or integrating several municipal service areas, either through a joint operating agreement or by moving the administration of water services to the upper tier of a two-tier system.

Economies-of-scale may also be achieved by merging the operations and/or ownership of water systems over a larger area. The *Municipal Act* provides the authority for two or more municipalities to establish a joint operating agreement for specific services, including drinking water services[22]. Under such an arrangement, the municipalities involved jointly own and operate a water system that serves their communities. While greater savings can be made if only one system is serving more than one community, it could equally involve more than one waterworks system.

An example of a successful joint operating arrangement was found in Lennox and Addington County[23]. A joint operating agreement was negotiated amongst three municipalities, including the Town of Napanee, the Township of North Frederickburgh, and the Township of Richmond. The agreement, and the water services, are administered by a joint operating board.

The Town of Napanee's treatment system has excess capacity, and its distribution system was already reaching beyond the municipal limits, into the adjacent municipalities. Rather than continue a contractual arrangement, whereby the two municipalities would pay Napanee for its drinking water services, a joint operating agreement was negotiated. This arrangement had several benefits for the smaller municipalities.

First, when one municipality serves another municipality under contract, it has the power to raise user fees considerably (and somewhat arbitrarily) for the service. Under a joint operating agreement, the participating municipalities negotiate a mutually agreeable water rate.

[22] See Sec. 207 (5) of the *Ontario Municipal Act*.

[23] Due to the amalgamation of the participating municipalities into the Town of Greater Napanee in 1998, the joint operating agreement was no longer needed.

Second, under a contractual arrangement, the municipality that owns the treatment system has final say on where additional water capacity will be diverted. If there is limited capacity, it will opt for new connections within its own boundaries, at the expense of new connections in the other municipalities. Under a joint operating agreement, all participating municipalities have a say in how excess water capacity is used. However, this issue still has the potential to be contentious.

Such an arrangement can also have benefits for the municipality with the water treatment plant, depending on the terms of the agreement. In the case of Napanee, as it had excess treatment capacity, and the distribution system already extended beyond its boundaries, there was little additional cost to add on more customers. In fact, adding more customers decreased the per customer cost. However, infrastructure replacement costs do increase with more customers. This is why the agreement stipulates that participating municipalities must finance their own distribution system capital costs.

In short, the smaller municipalities are subsidized by the larger town as they are spared the cost of building a treatment plant and benefit from economies of scale in the operational costs. At the same time, the smaller municipalities are subsidizing the operational costs of the larger town.

Such an arrangement is obviously most beneficial when adjacent municipalities are in close enough proximity to make connections to the existing system.

Some administrative economies-of-scale may also be achieved by delegating water services to the upper tier in a two-tier municipal system. For example, the Region of Niagara is responsible for the treatment of water, and sells water in bulk to municipalities within the Region. The municipalities themselves are responsible for distribution. This is less common within the county structure, although the restructured County of Oxford, which is something of a hybrid county-region, has responsibility for all lower-tier municipal water systems within its boundaries. Whether savings are generated depends on the number of customers per kilometer, and the number of systems serving the area.

It should be noted that merging of systems is a form of cross-subsidization, whereby one community shares the load of another community's higher per unit costs.

While some municipalities have clearly taken advantage of creating economies of scale, others simply lack easily accessible information on who to work with to create such savings. A clearinghouse of information on bulk purchasing opportunities or joint operating ventures would assist those municipalities in connecting into an economies of scale network.

5.4.2 Proactive Maintenance

Cost savings can also be achieved by implementing a proactive maintenance program, to reduce leakage and to detect and or repair cracks before they become more serious ruptures. Significant savings can be gained by prolonging the life of watermains, reducing the rate of watermain breakage, and thus reducing water loss through leakage.

Loss of water represents a significant cost to municipal systems, particularly older systems. Total water loss averaged out across the province has been estimated as high as 20%, which, if correct, would represent approximately $150 million in lost revenue per year. (Morra, 2001)

A Canada Works Study undertaken in 1987, estimated that $15 million could be saved across the province if the number of breaks per 100 km could be reduced to 10. In a survey of municipal water systems, most municipalities reported between 11-25 breaks per 100km, but some reported as many as 50 breaks per 100 km. (Elstad, 1987.p. 19-20). Savings from a reduction in the amount of 'unaccounted for water' can also add up. It was estimated that total water lost per year in Ontario in 1987 was 34.3 billion imperial gallons. If a rehabilitation program could reduce this amount by 1/4 , it would result in an estimated saving of nearly $5 million/year (Elstad, p. 31).

A number of major municipalities in Ontario have had water infrastructure asset management and replacement programs in place for years. The City of Toronto has had a water main/systems maintenance and replacement program in place for the last four decades, allocating about 2% of the replacement value per year. Similarly the Regions of Peel and Durham have equally established programs.

5.4.3 Alternative Treatment Technologies

Cost saving can also be achieved with the application of alternative, less capital-intensive technologies, such as ultraviolet disinfection, and membrane technology. Traditional water treatment systems and holding tanks are costly, and require a considerable amount of land on which to be located.

The Region of Waterloo has had some success in applying UV technology to groundwater, with good results, and some cost-savings.

New technologies that are currently available are limited in their applicability. If these and other emerging technologies are to be adopted, more funding is needed for research to determine the conditions under which they are most effective.

5.4.4 Water Conservation

A final option for reducing costs is to actively promote water conservation measures to reduce the amount of water being consumed by residents and businesses. Conservation measures can save money in two ways- by reducing the amount of water being treated by the municipal system, and by reducing the amount of sewage in need of treatment. Water conservation can be promoted through effective consumer education programs, the promotion of water efficient fixtures, and through pricing practices, which link user fees to the amount of water consumed (see below).

The City of Barrie successfully instituted a water conservation program. In order to manage the fastest growth rate in Ontario, the municipality decided to save scarce resources by deferring the expansion of its sewage treatment plant. It embarked on an aggressive, three year conservation program to install water efficient fixtures in households, including toilets, showerheads, and aerators. The municipality subsidized

the installation of these low-flow fixtures to 11,000 households, a third of residential customers in Barrie. It also made the installation of low-flow fixtures a requirement for new household development. It is estimated that over 50% of households in Barrie now have low-flow fixtures.

For an initial $2.2 million investment, the municipality achieved a reduction in water consumption of 61 litres per person per day, for a total of 1,800 cubic meters per day. It also achieved a 6-year deferment of the sewage treatment plant expansion, saving the $27 million for the project for that period of time, and permanently deferring the cost of treating 657,000 cubic metres of water per year, and its treatment once discharged into the sewage system.

5.5 Increase Finance Management Options

Part of the difficulty for municipalities in financing assets that have a life span of 50-100 years is the lack of financing options that mirror this lifecycle. Debt amortization periods are considerably shorter than the lifecycle of the assets, ranging from 10-20 years. This means that customers paying during the first 10-20 years of the life of the asset pay a disproportionate share of the cost of the asset (unless the asset is paid for through grants, in which case, the Ontario public at that time pays a disproportionate share). One of the case study municipalities identified the heavy debt burden as a significant problem in the financing of their waterworks.

Two measures could be offered to municipalities to alleviate this short term debt burden.

First, by extending the debt amortization period of borrowed funds to more closely match the lifecycle of the assets, debt servicing payments would be both more equitable, and more manageable for ratepayers. It is unlikely that a bank would offer such terms. However, an agency with a Government of Ontario as guarantor likely could. The Ontario Water Resources Corporation used to offer loans with 30-year amortization periods (Sancton, 2001). There is much merit in considering a lending program that offered loans with extended amortization periods to municipalities expressly for the payment of municipal assets.

There is also merit in reviewing the Ministry of Municipal Affairs and Housing's method of determining a municipality's allowable debt limit. A separate category for longer term, infrastructure or utility debt should be considered.

Another way to alleviate the burden of debt on municipal ratepayers is to secure a lower rate of interest. The Province could create a legal and institutional climate that minimizes the cost of capital for local water utilities. For example, the Province could also establish a revolving fund for municipal water authorities. The fund would make low-interest loans to municipalities for use in expanding or rehabilitating water supply systems. Such a fund would become a permanent pool of capital from which municipalities could borrow at below-market interest rates; repayments of the initial loans would in turn be lent to others for further water supply investments.

The Province could establish bond pools for municipal water services, which would help issuers to take advantage of the economies of scale that characterize credit markets. In the US, tax-exempt bonds supply capital used by water supply utilities (Congressional Budget Office, 1987).

Municipalities could also take advantage of recent financial innovations involving the private sector. Increasingly, municipalities are exploring the financial benefits of lease-back arrangements with a private financial services company. Under such an arrangement, a water treatment plant may be leased to the private company for a twenty year period, at which point, ownership reverts back to the municipality. The private company gains by writing off the depreciating value of the assets. The municipality gains by receiving a lump sum from the private company, as well as a more competitive interest rate on loans (1% lower) that can be secured by the company, which reduces costs for the municipality.

These types of financial instruments could provide greater funding stability, at least in the short run, by providing municipalities with an injection of capital to invest in their infrastructure.

5.6 Moving to Full Cost Recovery?

Moving to full-cost recovery would certainly be a positive move in terms of raising much needed revenues to invest in municipal water systems. The question remains, however, what are the implications of full cost recovery in practical terms? For municipalities with a small service area, but steep capital costs, full cost recovery could result in water fees shooting through the roof.

Even in larger municipalities, the feasibility of implementing full cost pricing of water services depends largely on the required infrastructure improvements in the short-term. That is to say, if the infrastructure is in the early or mid-stage of its lifecycle, then large capital expenditures are years off, and can be planned for through full cost pricing. However, if the infrastructure is nearing the end of its useful life, and is in need of replacement in the short term, the implementation of full-cost accounting is more difficult. So moving to full-cost recovery in the short to medium term may pose challenges for some municipalities, and may not be feasible in very small systems in their current state.

A comprehensive review of the implications of moving to full cost recovery is needed, to identify which municipal water systems may find the transition difficult or even unmanageable in their current state.

5.8 Conclusion

Some municipalities clearly need to strengthen their financial capacity, particularly if senior government grants continue to decline or are phased-out altogether. There are a variety of strategies to reduce costs, to make financing more manageable over the long term, to reflect the true cost of water treatment and delivery, and to increase revenues through full cost recovery.

Ultimately, there may be a need for other supporting financial instruments to bridge the financing gap for municipalities whose ratepayers simply cannot afford to move to full-cost recovery. Federal and provincial assistance to municipalities with weaker financial capacity may be needed, such as loan guarantees, or direct subsidy to offset high capital financing costs created by dis-economies of scale.

6. CONCLUSION

Municipalities are experiencing a period of dramatic and rapid change. Basic tenets of the traditional municipal financing model are being challenged and reexamined. The transition through amalgamations and downloading have put municipal finances under tremendous strain, particularly given the relatively static nature of municipal revenues.

Within this context, questions of the financial sustainability of municipal water systems are coming under scrutiny. It is undisputable that investment in waterworks infrastructure needs to increase substantially. In the face of declining federal and provincial grants, municipalities need to adapt their financing strategies accordingly. Moving to full cost recovery would increase the capital available to municipalities for such investment appreciably.

The case studies of municipal waterworks financing illustrated the very different approaches, and capacity, even within a small sample. The differences in approaches and financial capacity is much more extreme across the province, from small villages delivering water to several dozen residents, to large cities delivering water to millions of residents.

Municipalities may adopt a number of strategies to strengthen their capacity to finance their drinking water systems. First and foremost, municipalities must adopt a longer-term financing strategy, with consideration to the full lifecycle of their assets. Asset management plans should become the basis of their waterworks financing strategy. Municipalities may adopt cost saving measures, such as water conservation, and creating and capitalizing on economies-of-scale by merging ownership and operations of two or more communities' water systems. However, these strategies in and of themselves do not provide the financing that is required. In the absence of senior government grants, this can only come from a significant increase in user fees, towards full cost recovery.

Full cost recovery has many benefits. However, it also has implications, for municipalities with steep infrastructure costs in the short term, for smaller water systems with a small customer base, and for unserviced areas, that will need to pay for building their systems from scratch. A comprehensive review of the implications of moving to full cost recovery is needed, to identify which municipalities may find the transition difficult or even unmanageable in their current state.

Ultimately, a one-size-fits-all financing template will not be adequate. Customized financing arrangements to local circumstances, to reflect the diversity of water systems and communities throughout the province, is the only way to ensure the financial sustainability of these systems into the future.

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APPENDIX 1: Water Service Financing and Practice Case Study Comparison, A report prepared by PricewaterhouseCoopers