

# **Toward Financially Sustainable Drinking- Water and Wastewater Systems**

**August 2007**

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**Ministry of the Environment**

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## Table of Contents

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Key Acronyms .....	2
Introduction .....	3
Part 1 General Approach and Principles .....	4
1.1 A Flexible, Locally-Driven Approach to Financial Sustainability .....	5
1.2 Principles of Financially Sustainable Water and Wastewater Services .....	5
1.3 Policy Context .....	7
1.3.1 The Municipal Drinking-Water Licence Program .....	7
1.3.2 Full Accrual Accounting .....	8
1.3.3 The Financial Information Return (FIR) .....	10
1.3.4 The Clean Water Act and Source Water Protection .....	11
1.3.5 Financial Plans and Source Water Protection Costs .....	12
1.3.6 Municipal Water and Wastewater Service Corporations .....	13
1.3.7 Ontario's Lead Action Plan .....	14
1.4 Financial Plan Regulatory Requirements .....	14
1.4.1 Financial Plans for Existing Drinking-Water Systems .....	15
1.4.2 Length of Projections .....	17
1.4.3 Approval of Financial Plans .....	17
1.4.4 Timing .....	17
1.4.5 Public Transparency .....	18
1.4.6 Financial Plans for New Drinking-Water Systems .....	20
1.4.7 Consolidated Financial Plans .....	21
1.4.8 Existing Documents and Additional Information .....	21
1.5 Integrated Planning .....	21
1.6 Building on Existing Practices .....	22
Part 2 Possible Approaches .....	24
Introduction .....	25
Chapter I: Determining Service Needs .....	26
I.1 Overview .....	26
I.2 A Conceptual Building-block Approach to Determining Utility Needs .....	26
I.2.1 Measuring Current Period Expenses .....	27
I.2.2 The Appropriate Level of Accounting Surplus .....	31
I.3 Contributions to Municipalities .....	32
I.4 Proposed Step-By-Step Approach .....	33
Chapter II: Current Period Expenses .....	34

II.1	Operating Expenses .....	34
II.2	Interest Expense .....	35
II.3	Amortization of Tangible Capital Assets .....	35
II.4	Summary of Current Period Expenses.....	36
II.5	Issues in Coming to Current Period Expenses.....	38
II.5.1	A Three Service Approach .....	38
II.5.2	Fire Protection Costs .....	40
II.6	Forecasting Operating Expenses.....	41
II.6.1	Future Customer Demands.....	42
II.6.2	Repair and Maintenance Costs.....	43
II.6.3	Input Commodity Costs.....	43
II.7	General Forecasting Approach.....	44
<b>Chapter III: Long-Term Capital Expenditure Planning .....</b>		<b>46</b>
III.1	The Need to Move Beyond Current Period Expenses.....	46
III.2	Preparing a Capital Investment Plan .....	47
III.2.1	Overall Objectives.....	47
III.2.2	Projection Horizon .....	48
III.2.3	The Different Categories of Expenditures .....	49
III.2.4	Replacement of Existing Assets .....	50
III.2.5	Municipalities with a declining population base .....	51
III.2.6	Estimating Asset Life.....	51
III.2.7	Estimating Replacement Costs.....	54
III.2.8	Index Historical Cost Data .....	55
III.2.9	Accounting for Inflation.....	56
III.2.10	Expenditures for Service Enhancements.....	57
III.2.11	Expenditures for Growth .....	57
III.3	Asset Management.....	57
III.3.1	Single Asset vs. Component Capitalization.....	58
III.3.2	Relationship to Financial Planning .....	58
III.3.3	Condition Assessments.....	60
III.3.4	Life-cycle Planning .....	60
III.3.5	Accounting for Water Losses .....	61
III.3.6	Replacing Lead Service Lines with Safer Materials.....	63
III.3.7	Information Base Resources .....	64
<b>Chapter IV: Funding Plans .....</b>		<b>66</b>
IV.1	Overall Approach.....	66
IV.1.1	Building on Accrual Measures of Cost.....	66
IV.1.2	Possible Capital Funding Sources .....	67

IV.1.3	Key Objectives in Fund Planning .....	68
IV.1.4	Planning Horizon .....	69
IV.1.5	The Differing Nature of Capital Expenditures .....	70
IV.2	Possible Funding Plan Calculations .....	71
IV.3	The Funding Plan: A Hypothetical Example .....	73
IV.3.1:	Updates to the Plan.....	84
IV.3.2:	Consideration of Construction Phasing.....	86
IV.3.3:	Treatment of Contributed Assets .....	88
<b>Chapter V:</b>	<b>Revenue Sources and Rate Structures .....</b>	<b>89</b>
V.1	Rate Structure Objectives .....	89
V.2	Revenue Sources .....	90
V.3	The Role of Property Taxes.....	90
V.4	Capital Specific Funds.....	91
V.5	Sources of Capital Financing .....	92
<b>Chapter VI:</b>	<b>Feedback and Continuous Improvement .....</b>	<b>93</b>
VI.1	Review and Renewal of Financial Plans.....	93
VI.1.1	Periodic Review of Past Projections.....	93
VI.1.2	Business Case as a Good Practice .....	95
VI.1.3	Indicators of Funding Plan Reasonableness .....	96
VI.2	Organizing and Operating Water and Wastewater Systems .....	97
VI.2.1	Organizational and Governance Models .....	97
VI.2.2	Operation of Water and Wastewater Facilities .....	98
VI.3	Roles and Responsibilities .....	99
VI.3.1	Municipal Staff.....	99
VI.3.2	Auditors .....	101
VI.3.3	Municipal Council.....	102
<b>Appendix A:</b>	<b>Public Consultation.....</b>	<b>103</b>
<b>Appendix B:</b>	<b>Glossary .....</b>	<b>104</b>



## Key Acronyms

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<b>CICA</b>	Canadian Institute of Chartered Accountants
<b>CWA</b>	<i>Clean Water Act, 2006</i>
<b>DCA</b>	<i>Development Charges Act, 1997</i>
<b>FIR</b>	Financial Information Return
<b>MDWLP</b>	Municipal Drinking-Water Licence Program
<b>MOE</b>	Ministry of the Environment
<b>OMBI</b>	Ontario Municipal Benchmarking Initiative
<b>PSA</b>	Public Sector Accounting
<b>PSAB</b>	Public Sector Accounting Board (under the CICA)
<b>TCA</b>	Tangible Capital Assets
<b>SDWA</b>	<i>Safe Drinking Water Act, 2002</i>

## Introduction

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In Part Two of his Report of the Walkerton Inquiry, Justice Dennis O'Connor highlighted the importance of ensuring that municipalities plan for the long-term financial sustainability of their drinking-water systems to guarantee the safety of their drinking water into the future.

As part of the province's commitment to implement all of Justice O'Connor's Walkerton Inquiry recommendations, the Minister of the Environment (MOE) has made a regulation (O. Reg. 453/07) under the *Safe Drinking Water Act, 2002* (SDWA) that prescribes the requirements for Financial Plans to be prepared as part of the Municipal Drinking-Water Licence Program set out in Part V of the SDWA.

This document is a Guideline designed to assist municipalities in preparing the required Financial Plans under the Financial Plans Regulation. It also sets out broad principles and practical advice that will assist municipalities in moving towards long-term financial sustainability of water services. Topics discussed are relevant to wastewater and storm water service as well, particularly in cases where utilities provide integrated service. The Guideline is not required practice, but is designed to provide assistance to municipalities and to help build capacity in financial planning.

This Guideline is divided into two parts:

**Part I** discusses the province's approach to promoting financially sustainable water and wastewater systems, including principles of financial sustainability and the broader policy context.

**Part II** introduces a number of possible approaches to implementing the principles outlined in Part I.

Taken together, the Regulation and Guideline are a key step in the province's long-term strategy to ensure the financial sustainability of municipal drinking-water and wastewater systems.

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**Part 1**

**General Approach and Principles**

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## **1.1 A Flexible, Locally-Driven Approach to Financial Sustainability**

Stakeholders have emphasized the importance of a flexible and gradual approach to achieving financially sustainable water and wastewater services. Ontario municipalities face a range of unique circumstances and take different approaches to financial planning when it comes to their water and wastewater services. The province's approach to moving toward financially sustainable water and wastewater systems responds to this feedback and encourages municipalities to consider local circumstances where appropriate.

The Financial Plans Regulation is a key component of this flexible approach. The Regulation's requirements are intended to accommodate existing financial planning practices and municipal accounting standards. This Guideline is another key component of this approach and aims to build capacity regardless of the starting point, and in a way that can be tailored to meet local needs. The Guideline also strives to share the knowledge and experiences of Ontario municipalities, large and small.

Stakeholders, particularly smaller municipalities, have also indicated that tools as well as support and guidance would be of great assistance. These tools would help avoid the need for each municipality to undertake potentially redundant and costly work. The Guideline, particularly throughout Part II, provides a first response to these requests and provides references to other resources.

The Guideline presents a range of topics relevant to discussions about water and wastewater financial sustainability. Examples include accounting practices, asset management, and approaches to financing. The Guideline approaches these topics with a broad audience in mind. The intent is that municipal utility, finance and accounting departments will find the discussion of these topics to be informative and illustrate the benefits of an integrated approach.

## **1.2 Principles of Financially Sustainable Water and Wastewater Services**

Achieving financial sustainability in Ontario's municipal water and wastewater sector is a long-term goal. Systems are aging, there is a growing amount of deferred maintenance, and many assets are nearing, or even beyond, the end of their useful lives and in need of replacement.

Financial sustainability is needed to ensure that Ontarians continue to enjoy clean and safe drinking water, that water and wastewater services are reliable in the long term, and that environmental protection is maintained.

This section introduces nine principles to help develop Financial Plans and to inform the transition toward financial sustainability. The remainder of this Guideline builds on these principles and introduces approaches to implement them.

- Principle #1: Ongoing public engagement and transparency can build support for, and confidence in, financial plans and the system(s) to which they relate.
- Principle #2: An integrated approach to planning among water, wastewater, and storm water systems is desirable given the inherent relationship among these services.
- Principle #3: Revenues collected for the provision of water and wastewater services should ultimately be used to meet the needs of those services.
- Principle #4: Life-cycle planning with mid-course corrections is preferable to planning over the short-term, or not planning at all.
- Principle #5: An asset management plan is a key input to the development of a financial plan.
- Principle #6: A sustainable level of revenue allows for reliable service that meets or exceeds environmental protection standards, while providing sufficient resources for future rehabilitation and replacement needs.
- Principle #7: Ensuring users pay for the services they are provided leads to equitable outcomes and can improve conservation. In general, metering and the use of rates can help ensure users pay for services received.
- Principle #8: Financial Plans are “living” documents that require continuous improvement. Comparing the accuracy of financial projections with actual results can lead to improved planning in the future.
- Principle #9: Financial plans benefit from the close collaboration of various groups, including engineers, accountants, auditors, utility staff, and municipal council.

Implementation of these principles of water and wastewater financial planning will have benefits and implications that go beyond the financial health and physical status of the water facilities and infrastructure. Long term financial planning and asset management can have environmental benefits, such as the

enhancement of conservation through reduced leakage rates from aging water mains, and reduced effluent discharges into surface water.

This Guideline suggests that long term financial planning can go hand-in-hand with longer term environmental planning. As will be discussed later in this Guideline, the “costs” of a water system can take into account source water protection and other environmental compliance costs.

### **1.3 Policy Context**

Before discussing the Financial Plans Regulation in-depth or considering principles of financial planning in greater detail, this section briefly discusses the policy context for the development of water and wastewater Financial Plans.

#### ***1.3.1 The Municipal Drinking-Water Licence Program***

As part of the province’s commitment to fulfill all of Justice O’Connor’s Walkerton Inquiry recommendations, the MOE is implementing a new approvals framework under the SDWA for municipal residential drinking-water systems called the Municipal Drinking-Water Licence Program.

Justice O’Connor recommended that owners of municipal water systems obtain a licence for the operation of their drinking-water systems. The licence will be issued to owners by the Ministry under the SDWA if the owner demonstrates that it has the following five elements in place:

1. A drinking-water works permit (DWWP)
  - A permit to establish or alter a drinking-water system.
2. An accepted operational plan
  - The Drinking-Water Quality Management Standard (DWQMS) will be the standard upon which operational plans will be based.
  - The plan will document an operating authority’s quality management system (QMS).
3. An accredited operating authority
  - A third-party audit of an operating authority’s QMS will be the basis for accreditation.
4. A Financial Plan
  - This must be prepared in accordance with the prescribed requirements in the Financial Plans Regulation, discussed below.
5. A permit to take water (PTTW)

- Requirements as outlined in the *Ontario Water Resources Act*.

In addition, a licence will only be issued if the Director is satisfied that the system will be operated in accordance with the requirements under the SDWA and the conditions in the licence.

Financial Plans are one of the elements which must be put in place for a licence to be issued. However, in the case of the first licence for an existing drinking-water system, the Financial Plan will be required through a condition of the licence. Under section 30 of the SDWA, the Financial Plans element of the Licence Program must either be prepared in accordance with the *Sustainable Water and Sewage Systems Act, 2002* or in accordance with requirements set out by the Minister of the Environment. At this time, the government's approach is to require Financial Plans through the development of a Financial Plans Regulation under the SDWA that outlines requirements set out by the MOE. This Regulation's requirements are outlined below, while possible approaches to developing Financial Plans in accordance with the Regulation are in Part II of this Guideline.

In May 2007, the government proclaimed the sections of the SDWA related to the Licensing Program and filed the Licensing of Municipal Drinking-Water Systems Regulation (O. Reg. 188/07). Under the Licensing Regulation, owners of municipal residential drinking water systems are required to submit an operational plan and applications for a DWWP and licence. Dates for these submissions are being phased over an 18-month period starting January 1, 2009, and ending on June 1, 2010. Large municipalities will submit first, followed by medium-sized and then small municipalities.

On July 31, 2007, the ministry posted the remaining Municipal Drinking Water Licensing Program policy decision notices (i.e., Director's direction, accreditation protocol and implementation guide) to the Environmental Registry.

Additional information on the Licensing Program can be found on the *Drinking Water Ontario* portal ([www.ontario.ca/drinkingwater](http://www.ontario.ca/drinkingwater)).

### **1.3.2 Full Accrual Accounting**

In June 2006, the Public Sector Accounting Board (PSAB) of the Canadian Institute of Chartered Accountants (CICA) approved new municipal financial accounting and reporting standards requiring that tangible capital assets (TCA), including water and wastewater systems, be included in municipal financial statements. Full accrual accounting provides a new view of cost for financial reporting purposes. The implications for municipalities are significant, particularly for public works departments.

The new accounting standard PS 3150, comes into effect on January 1, 2009, and the first financial statements reflecting this change are anticipated no later than May 31, 2010. The comparison year is 2008, which means that the necessary data will need to be available for 2008, although it does not have to be reported until the 2009 financial statements are published.

This transition has important implications for water and wastewater financial sustainability. PS 3150 will make municipalities and the public more aware of the investment in physical infrastructure, and the cost of using an asset to provide services over its useful life. It will also encourage long-term planning for capital renewal and replacement, and begin to provide a more informed basis for setting water rates.

The municipal transition to full accrual accounting is expected to provide a useful foundation for financial planning. By itself, however, it is not the complete answer. As discussed in Part II, other tools are needed to help inform rate setting and to plan for the future. Nevertheless, full accrual accounting could provide a jumping-off point for implementing long-term asset management if that objective is established at the outset. This Guideline recommends that municipalities view accounting standard PS 3150 as an opportunity to move toward comprehensive asset management.

It is recognized that municipalities will have to do a significant amount of work to implement full accrual accounting for tangible capital assets. It is recommended that municipalities use this work as a starting point when preparing Financial Plans.

The CICA Public Sector Accounting (PSA) Handbook is the primary authoritative source for generally accepted accounting principles. Readers are encouraged to become familiar with the accounting standards. Subscription to the PSA Handbook is available through the CICA.

In addition to the PSA Handbook, a number of other organizations and resources are available to assist with the transition to full accrual accounting:

1. The Ontario Municipal Benchmarking Initiative (OMBI) has released three documents on the subject, including:
  - Municipal Guide to Accounting for Tangible Capital Assets – Version 2;
  - Implementation of Accounting for Tangible Capital Assets – Pilot Studies; and,
  - Implementation of Accounting for Tangible Capital Assets – Reference Manual.

These documents provide information about developing TCA inventories, applying initial dollar values to inventories, and amortizing TCA. Asset

capitalization, disposals, write-downs, reporting considerations, and various other technical topics are also addressed.

2. The Public Sector Accounting staff of the CICA has released a Guide to Accounting for and Reporting Tangible Capital Assets – Guidance for Local Government Entities That Apply the Public Sector Handbook. This Guideline is a useful reference for local governments implementing Section PS 3150, *Tangible Capital Assets*, and the new reporting requirements. It contains valuable information on the need for and benefits of accounting for tangible capital assets, implementation considerations and subsequent accounting requirements. It also suggests how that information could be linked with ongoing asset management practices.
3. In addition, full day workshops, hosted by the Association of Municipal Clerks and Treasurers of Ontario (AMCTO) and the Municipal Finance Officers' Association (MFOA), are available. In addition, these organizations have jointly published a series of newsletters on the subject of full accrual accounting.<sup>1</sup>

This Guideline is intended to build on the work that has already been done. Although this Guideline includes a discussion of why it makes sense to build on this work, the primary focus of this Guideline is on the preparation of long-term Capital Investment and Funding Plans.

### **1.3.3 The Financial Information Return (FIR)**

The FIR is a data collection tool used by the Ministry of Municipal Affairs and Housing to collect municipal financial and statistical information. All municipalities submit financial information electronically to the province through a series of standardized templates. Information is for the previous fiscal year, and is submitted annually by May 31. Information in the FIR should be consistent with audited municipal financial statements.

The FIR includes financial information derived from the financial records underlying the annual financial statements of the municipality prepared pursuant to subsection 294.1 of the *Municipal Act, 2001* and in accordance with generally accepted accounting principles<sup>2</sup> for local governments as recommended, from time to time, by the Public Sector Accounting Board of the Canadian Institute of Chartered Accountants.

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<sup>1</sup> For more information, see <http://www.amcto.com/db/assetmgmt.asp>.

<sup>2</sup> Generally accepted accounting principles (GAAP) encompass broad principles and conventions of general application, as well as rules and procedures that determine accepted accounting practices at a particular time. The primary sources of GAAP for public sector bodies are the standards in Sections PS 1200 to PS 3800; Public Sector Guidelines; and appendices and illustrative material contained in the CICA Public Sector Accounting Handbook.

Depending on the organizational model chosen by a municipality, different accounting standards may apply, and the way financial information is reflected on municipal financial statements may differ. Separate financial statements are required for municipal corporations established under the *Municipal Services Corporations Regulation* (Ontario Regulation 599/06) under the *Municipal Act, 2001* and the *City Services Corporations Regulation* (Ontario Regulation 609/06) under the *City of Toronto Act, 2006*. For example, government business enterprises and government business type organizations would likely follow the CICA Accounting Handbook. Although the form and content may differ, their individual financial statements will still provide a useful basis for long-term financial planning.

A new schedule is being developed by the province as part of other revisions to existing FIR schedules necessary to reflect the transition to full accrual accounting. This new schedule will be available for fiscal year 2009. It will bring together all the information about water and wastewater systems currently scattered throughout the FIR schedules. This new schedule will organize information, to the fullest extent possible, in the form of a statement of operations and a statement of financial position. The intention is for these statements to be reconcilable with each municipality's GAAP statement. The schedule will provide a more comprehensive picture of water and wastewater system finances in a format useful for broader financial planning work.

Similar to the revisions being made to the FIR schedules, the specific requirements of the Financial Plans Regulation, which are outlined below, have been developed to be consistent with the transition to full accrual accounting.

#### ***1.3.4 The Clean Water Act and Source Water Protection***

With the passage of the *Clean Water Act, 2006* (CWA) on October 19, 2006 and its proclamation on July 3, 2007 communities will be better able to protect their drinking-water supplies through the development of collaborative, locally driven, science and watershed-based source protection plans. The CWA advances a multiple barrier approach to drinking water protection, starting with the sources.

Components of the CWA include:

1. Identification of Source Protection Areas, Regions and Authorities (Conservation Authorities where they exist) for the purposes of source protection planning;
2. Requirements for a local multi-stakeholder Source Protection Committee to consult with municipalities and develop a Terms of Reference, Assessment Report and Source Protection Plan to address significant drinking water threats;

3. Requiring conformity (e.g. official plans) for those measures addressing significant threats and designated Great Lakes policies in the source protection plans. Policies addressing non-significant threats do not require conformity and decisions in relation to the issuance or amendment of a prescribed instrument (e.g. Certificate of Approval) but are required to “have regard” for non-significant threat policies;
4. The Minister’s authority to require action on Great Lakes issues; and,
5. New municipal authority to regulate significant drinking water threats located in Wellhead Protection Areas and Surface Water Intake Protection Zones through the development of negotiated risk management plans.

A number of regulations are under development in both the short and longer term to support the CWA. The first five regulations under the Clean Water Act took effect on July 3, 2007. These regulations establish the source protection planning process. Readers are encouraged to monitor Ontario’s Environmental Registry for information on these regulatory initiatives.<sup>1</sup>

### ***1.3.5 Financial Plans and Source Water Protection Costs***

Municipalities will have a strong role in developing and implementing source protection plans in all areas under municipal jurisdiction. Municipalities are already responsible for the delivery of municipal drinking-water and land use planning so the source protection process builds on this work. Municipalities will work with Source Protection Committees to develop and implement policies to reduce risks posed by activities located in areas under their jurisdiction.

The actual costs of source protection implementation will be quantifiable once technical studies and risk assessments for source protection plans are complete and local watershed characteristics and implementation needs can be determined. In undertaking financial planning for water and wastewater services, municipalities may wish to take into consideration the potential benefits of source protection activities. For example, protecting water at the source could result in reduced water treatment needs.

The protection of drinking water sources is a shared responsibility; therefore, the costs of source water protection implementation (i.e. protection measures/responses) will be borne across many sectors (e.g. industry, agriculture, property owners and municipalities). Under the Source Protection Program, the province has committed \$7 million in 2007-08 to support early action to protect drinking water sources. In addition, under the Ontario Drinking Water Stewardship Program, the 2007-08 budget includes another \$21 million over the subsequent three years to allow for outreach, education, and early

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<sup>1</sup> <http://www.ebr.gov.on.ca/ERS-WEB-External/>.

action to protect drinking water sources across the province, for a total of \$28 million.

**Note:**

*Financial Plans should include source protection costs related to the provision of water services. Utilities are encouraged to have, at minimum, estimates of any current source protection costs as a separate cost item by the time their Financial Plans are required in order to effectively align with the anticipated approval timelines for Source Protection Plans (2010 to 2012). Information on source protection implementation costs may be included in Financial Plans when these costs are identified and Source Protection Plans are approved.*

### **1.3.6 Municipal Water and Wastewater Service Corporations**

In December 2006, the government promulgated the Municipal Services Corporations Regulation (Ontario Regulation 599/06) under the *Municipal Act* and the City Services Corporations Regulation (Ontario Regulation 609/06) under the *City of Toronto Act*, extending broad authority for most service areas that municipalities provide, including water and wastewater. These new regulatory provisions mean that municipalities can create corporations to operate their water and wastewater services as long as they are 100 per cent publicly-owned and controlled.

Municipally-owned corporate utilities provide an opportunity to put in place a new approach to the provision of water and wastewater services. For example, municipal water and wastewater service corporations could allow for more independent borrowing and management while being accountable to municipal owners. These changes could give more operational flexibility to water service arrangements that span municipal borders, like area water systems.

Municipally-owned corporate utilities may also allow a municipality to more effectively “ring fence” its financial structure in order to keep its revenues and expenses separate from those of the municipality.

It is important to note that choice of organizational structure will affect the Generally Accepted Accounting Principle (GAAP) applied; the presentation of financial information; and how the financial affairs of the utility are reflected in the municipality’s financial statements.

### **1.3.7 Ontario's Lead Action Plan**

In June 2007, the government of Ontario proposed a Lead Action Plan in response to elevated lead in drinking water in a number of Ontario municipalities. The finalized Action Plan was released in July 2007 and includes the following elements:

1. All schools, as well as day care facilities with any plumbing installed prior to 1990, must test for lead annually.
2. Schools and day nurseries with any plumbing installed prior to 1990 must flush plumbing daily.
3. A regulatory program to make it mandatory for municipal residential and non-municipal year-round residential system owners to regularly sample for lead at a specified number of taps, notify homeowners of the results from their taps, and take corrective action in systems with elevated lead levels.
4. Assist low-income parents with young children and pregnant women with the cost of filters where they are recommended.
5. Encourage municipalities to conduct public education campaigns.

In addition to these new requirements for reducing lead in drinking water, the Financial Plans Regulation also contains requirements for municipalities to include in their Financial Plans the costs associated with replacing lead service pipes that are part of the drinking-water system. A detailed description of the Financial Plans Regulation requirements follows. For further information on the replacement of lead service pipes see Chapter III.3.6.

## **1.4 Financial Plan Regulatory Requirements**

This section of the Guideline provides a plain language explanation of the Financial Plans Regulation, O. Reg. 453/07, and its general requirements. The Regulation and the SDWA should be consulted for a more detailed understanding of the regulation's application.

The Regulation applies to all owners of large and small municipal residential drinking-water systems who are required to obtain a licence under Part V of the *Safe Drinking Water Act, 2002*, including municipal service boards and corporations established under the *Municipal Act, 2001* and the *City of Toronto Act, 2006*.

Though the Regulation only requires Financial Plans for drinking-water systems, this Guideline encourages financial planning for wastewater systems as well.

Sections 1.4.1 through 1.4.5 below describe requirements for existing drinking-water systems. Requirements for new drinking-water systems are different and are described in section 1.4.6.

#### **1.4.1 Financial Plans for Existing Drinking-Water Systems**

The Regulation requires Financial Plans to contain projections of prescribed categories of financial information. The required categories of information in the Regulation, listed in the text box below, are consistent with the presentation of financial statements in accordance with Section PS 1200 of the CICA Public Sector Accounting Handbook. While a number of definitions of financial terms are provided in the glossary of this Guideline, the reader may wish to refer to the CICA Guide to Accounting for and Reporting Tangible Capital Assets (April 2007) for a more comprehensive list of definitions.

##### ***Financial Plans for Existing Drinking-Water Systems:***

*Paragraph 4 of subsection 3(1) of the Regulation requires that Financial Plans include the following:*

- i. Details of the proposed or projected financial position of the drinking-water system itemized by,*
  - A. total financial assets\**
  - B. total liabilities,\**
  - C. net debt,\**
  - D. non-financial assets that are tangible capital assets, tangible capital assets under construction, inventories of supplies and prepaid expenses, and*
  - E. changes in tangible capital assets that are additions, donations, write downs and disposals.*
  
- ii. Details of the proposed or projected financial operations of the drinking-water system itemized by,*
  - A. total revenues, further itemized by water rates, user charges and other revenues,*
  - B. total expenses, further itemized by amortization expenses, interest expenses and other expenses,*
  - C. annual surplus or deficit, and*
  - D. accumulated surplus or deficit.*

- iii. Details of the drinking-water system's proposed or projected gross cash receipts and gross cash payments itemized by,*
- A. operating transactions, that are cash received from revenues, cash paid for operating expenses and finance charges, \**
  - B. capital transactions, that are proceeds on the sale of tangible capital assets and cash used to acquire capital assets,*
  - C. investing transactions, that are acquisitions and disposal of investments, \**
  - D. financing transactions, that are proceeds from the issuance of debt and debt repayment,*
  - E. changes in cash and cash equivalents during the year, \* and*
  - F. cash and cash equivalents at the beginning and end of the year. \**
- iv. Details of the extent to which the information described in subparagraphs i, ii and iii relates directly to the replacement of lead service pipes as defined in section 15.1 - 3 of Schedule 15.1 to Ontario Regulation 170/03 (Drinking-Water Systems), made under the Act.*

\* Subsection 3(2) of the Regulation permits certain categories of information to be excluded from the Financial Plans if it is not known to the owner at the time the plan was prepared. This provision recognizes that some financial information may be consolidated on a municipal level across numerous departments and it may be difficult for that information to be allocated to the drinking-water system (e.g. total liabilities and net debt). If the information is known for the drinking-water system, however, it would have to be included in Financial Plans.

In essence, the Regulation requires owners to project certain elements of their statement of financial position, statement of operations, and statement of cash flow. Each of these statements is discussed briefly below:

- The statement of financial position highlights the key figures that describe the financial position of the government at the reporting date. For example, the net debt position of the government is calculated as the difference between its liabilities and financial assets. The non-financial assets of the government are assets that are, by nature, normally for use in service provision and include purchased, constructed, contributed, developed or leased tangible capital assets, inventories of supplies, and prepaid expenses.
- The statement of operations reports the surplus or deficit from operations in the accounting period. The statement displays the cost of government services provided in the period, the revenues recognized in the period and

the difference between them. It measures, in monetary terms, the extent to which a government has maintained its net assets in the period.

- The statement of cash flow reports the change in cash and cash equivalents in the accounting period, and how a municipality finances its activities and meets its cash requirements.

Projections of these three statements will help provide a snapshot of a drinking-water system's projected financial situation, as well as the resources required to run and sustain the system.

#### ***1.4.2 Length of Projections***

Paragraph 2 of subsection 3(1) of the Regulation requires that Financial Plans project the required information over a minimum period of six years. Paragraph 3 specifies the first year of the period. For example, under subparagraph (i) the projection period begins with the year that the system's existing licence would expire. Under paragraph (ii), applicable to Financial Plans prepared to meet a condition of licence, the projection period begins with the later of 2010 or the year in which the first licence for the system was issued.

Making long term projections is important. Many municipalities already project their future costs for extended time horizons, but it is recognized that for some municipalities six years may be an initial step in financial planning. This Guideline encourages municipalities to adopt a life-cycle approach to managing assets as a long-term goal.

#### ***1.4.3 Approval of Financial Plans***

Paragraph 1 of subsection 3(1) of the Regulation requires that Financial Plans be approved by a resolution of council, if the owner of the drinking-water system is a municipality, or by a resolution of the governing body, if the owner is not a municipality. An example of a governing body may be a board of directors. Provincial approval of Financial Plans is not required, however, in order to ensure compliance with paragraph 6 of Subsection 3(1) of the Regulation and demonstrate that the required resolution has been passed by the system's owner, a copy of the Financial Plans for the system and the approving resolution should be submitted to the Ministry of Municipal Affairs and Housing.

#### ***1.4.4 Timing***

Under new municipal accounting standards, municipalities will have to adopt full accrual accounting practices beginning January 1, 2009. As municipal compliance with the new full accrual accounting requirements is an important

step in effective financial planning, submission of the first Financial Plans for a system will not be required before this date. Also, the requirement for Financial Plans has been aligned with the implementation dates for the Municipal Drinking-Water Licence Program, which are prescribed by the Licencing of Municipal Drinking-Water Systems Regulation.

The first Financial Plans for existing systems will be required by a condition of the system's drinking-water licence, as required by subsection 1(3) of the Financial Plans Regulation. Therefore, Financial Plans will not be required with an application for the first drinking-water licence for a system, but will be required no later than 6 months after the issuance of that system's first licence. The licence condition will require that Financial Plans for the system be submitted either by July 1, 2010, or six months after the licence is issued, whichever is later.

Once a system is licensed, Financial Plans are required to be updated in conjunction with every application for licence renewal. Subsection 1(2) of the Regulation requires the owner of a municipal drinking-water system to update and submit the updated Financial Plans to the Province before making an application to renew the drinking-water licence (*i.e.* every five years). The Regulation does not, however, preclude municipalities from updating Financial Plans more regularly. To meet their financial planning needs for revisions, section 5 of Regulation confirms that nothing in the Regulation prevents plans from being amended on a more frequent basis. This Guideline encourages regular updates of Financial Plans.

#### **1.4.5 Public Transparency**

Public transparency, including engaging the public in decision-making processes and public reporting of plans and results, is good practice. As Justice O'Connor noted in Part II of his report, "public confidence will be fostered by ensuring that members of the public have access to current information about the different components of the system, about the quality of the water, and about decisions that affect water safety." Ensuring effective access to information can also help water service operators educate and dialogue with consumers about proposed projects and investment decisions that will affect short-term rates, the long-term fiscal situation of the municipality, and the sustainability of the water service.

Paragraph 5 of subsection 3(1) of the Regulation requires owners of municipal drinking-water systems to make copies of Financial Plans available to members of the public who are served by the system and request the plans, at no charge, and to make plans available on a website on the Internet (if the municipality has a website). That section of the Regulation also requires the owner to provide notice to the public of the availability of the plans. It is left to the owner to

determine appropriate methods needed to bring the notice to the attention of members of the public served by the system.

These regulatory requirements are consistent with Principle #1, outlined earlier.

***Principle #1:***

*Ongoing public engagement and transparency can build support for, and confidence in, financial plans and the system(s) to which they relate.*

Although municipalities are required to make most information considered by council available to the public, it does not necessarily mean that such information is easily *accessible*. Some of the best plans can not be found easily on public websites.

***Case Study:***

*On Feb. 24, 2005, the Town of Perth held a public information night to discuss the status of water and wastewater service within the community. Town staff gave a detailed presentation on a recently completed water and sewer rate study, including the costing model used, financing options considered, and rationale for choosing one option over the others. Staff provided additional context by comparing new rates with those in nearby municipalities.*

*"We have found that being transparent about the financial resources required to maintain high quality, sustainable services increases support for our funding plan. We intend to maintain high levels of transparency and engagement with our customers going forward."*

*- Jorgen Hoeven*

*Director of Corporate and Environmental Services, Town of Perth*

***Further Reading:***

*Public Information Night: Water & Sewer, 2005.*

<http://www.town.perth.on.ca/files/{BD2B6789-4760-490C-9DAA-41BE66F153E0}Feb242005PresentationFinal.pdf>

#### **1.4.6 Financial Plans for New Drinking-Water Systems**

The establishment of a new drinking-water system is a significant undertaking, and thus it is important to ensure that the new system is financially viable. While neither the Regulation or Guideline provide a definition of financial viability, an owner should plan to have available an adequate level of resources to run and sustain a new drinking-water system, including both capital and operating costs. Section 2 of the Regulation outlines specific Financial Plan requirements that apply when an owner is applying for a drinking-water licence for a new drinking-water system (i.e., where no licence has been previously issued) under the *Safe Drinking-Water Act, 2002*. This provision does not apply to expansions or alterations to existing and licensed drinking-water systems.

As with Financial Plan requirements for existing systems, owners are required to prepare Financial Plans with six-year projections of financial information before making an application for a drinking-water licence for a new system. Unlike existing system requirements, however, only the details of the financial operations of the drinking-water system must be projected (see box below).

As with Financial Plans for existing systems, provincial approval is not required. However, unlike the resolution approving Financial Plans for existing systems, the resolution must contain a statement confirming that the proposed system is financially viable. In order to ensure compliance with paragraph 6 of Subsection 2 (1) of the Regulation and demonstrate that the required resolution has been passed by the system's owner, a copy of the financial plans and resolution should be submitted to the Ministry of Municipal Affairs and Housing.

The approval and public transparency requirements for Financial Plans for new systems are the same as for existing systems (see sections 1.4.3 and 1.4.5,). As for timing, Financial Plans for new systems will not be required before January 1, 2009. This is consistent with the implementation dates for the Municipal Drinking-Water Licence Program, which prescribed by the Licencing of Municipal Drinking-Water Systems Regulation.

#### ***Financial Plans for New Drinking-Water Systems:***

*Details of the proposed or projected financial operations of the drinking-water system are itemized by,*

- A. total revenues, further itemized by water rates, user charges and other revenues,*
- B. total expenses, further itemized by amortization expenses, interest expenses and other expenses,*
- C. annual surplus or deficit, and*
- D. accumulated surplus or deficit.*

#### ***1.4.7 Consolidated Financial Plans***

There may be cases where a single owner may own more than one drinking-water system. Under the Municipal Drinking-Water Licence Program, each of these systems requires a separate licence. When it comes to the organizing and managing numerous drinking-water systems, owners may aggregate some or all of their financial information. Therefore, section 4 of the Regulation provides that, for purposes of preparing Financial Plans for several systems that are wholly-owned by the same owner, for the purposes of preparing Financial Plans, the owner can treat the systems as one system and prepare a single Financial Plan for the systems.

The use of a single Financial Plan for more than one system is only permitted for existing drinking-water systems, and not for new systems. For example, if an owner wholly owns two or more existing systems and then constructs a new system, a single Financial Plan can be prepared for the existing systems but the new system must have its own Financial Plan with system-specific information. Since the required categories of financial projections are different for new systems and that the focus of this provision is to ensure the financial sustainability of the new system, that information should be readily identifiable. Subsequent Financial Plans for that system may be consolidated with other systems because that system would then be considered an existing system and be subject to the requirements in section 3 of the Regulation.

#### ***1.4.8 Existing Documents and Additional Information***

To provide municipal flexibility in complying with the regulatory requirements, existing document or documents may be used to satisfy the requirements of the Regulation if the document(s) includes, at a minimum, six-year projections of the categories listed above and comply with the Regulation in all other respects.

Also, information beyond that required by the Regulation may be included in the Financial Plans, as prescribed by section 6, provided the information required by the Regulations is easily identifiable.

### **1.5 Integrated Planning**

The Regulation requires municipalities to undertake financial planning for drinking-water systems only. This Guideline has been structured so that it can be used in the preparation of Financial Plans for drinking-water services, as well as for Financial Plans for wastewater services and combined storm sewers.

Approximately half of Ontario municipalities with water and wastewater systems have integrated these systems so that one entity is responsible for both water

and wastewater services. An integrated system allows owners and operators to make more rational decisions about operations, capital investment and environmental protection – choices that recognize the inherent inter-relationship between water and wastewater services. This Guideline encourages municipalities to jointly plan for their water and wastewater services. Note however, that information for drinking-water systems must be kept separate from other services for reporting purposes under the Financial Plans Regulation.

Storm water management, and how this relates to financial planning, warrants special consideration. Some municipalities may have wastewater and storm water sewers that are combined in certain areas. Municipalities may also refer to these systems as “sanitary” and “storm water” sewers. In other cases, storm water sewers are stand-alone. This Guideline encourages municipalities to structure their accounts to reflect the three separate activity areas: water, wastewater, and storm water. This will allow costs and assets to be identified on a segmented basis for each of the activity areas. This approach has long term practical benefits, particularly for asset management.

***Principle #2:***

*An integrated approach to planning among water, wastewater, and storm water systems is desirable given the inherent relationship among these services.*

## **1.6 Building on Existing Practices**

The Financial Plans Regulation is intended to build on existing municipal practices. Municipalities generally prepare forward-looking plans as part of their annual budgeting process. Budgets are important, but they do not necessarily present water and wastewater information in an accessible format, nor do they necessarily reflect a life-cycle view of assets.

A number of other tools are used by municipalities to plan for future investment. These include annual reports, water rate studies, by-laws, and council minutes. Practices vary considerably across Ontario when looking at how far forward projections are made, how segregated plans are based on functional areas and how information is presented.

The Regulation is intended to permit municipalities to use existing financial documents, as long as the regulatory requirements are met. While the Regulation applies only to drinking-water systems, consolidated water and wastewater related financial documents may also be used to comply with the Regulation if information pertaining to drinking-water systems is clearly separated.

In many cases, municipal Financial Plans are already guided by the principles and are informed by the policy initiatives outlined in this Guideline. Part II of this Guideline is intended to serve as a resource for those municipalities seeking additional advice in ensuring the provision of financially sustainable water and wastewater systems.

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**Part 2**

**Possible Approaches**

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## **Introduction**

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In Part I of this Guideline, a list of financial planning principles for water and wastewater systems was introduced. Part II of the Guideline elaborates on these principles, as well as introduces other information which utilities may find useful in preparing their Financial Plans and moving towards financial sustainability. Principles are enclosed in text boxes throughout. Scenarios of municipal practices, both real and hypothetical, are also highlighted throughout. It is hoped such examples will prove useful to demonstrate how the concepts discussed can be implemented.

Good knowledge of full accrual accounting is very important in designing Financial Plans. Although this Guideline is not intended to serve as an accounting authority, it does contain brief discussions of some accounting topics. The discussion is at an introductory level so as to be accessible to the broad intended audience of this Guideline. However, readers are encouraged to become familiar with generally accepted accounting principles contained in either the CICA Public Sector Accounting Handbook or the CICA Accounting Handbook as appropriate to their organizational structure. Readers can also consult other sources, such as publications by groups such as the Public Sector Accounting Board (PSAB) and the Ontario Municipal Benchmarking Initiative (OMBI) for practical guidance on interpreting and implementing accounting standards. Section 1.3.2 of Part I of this document contains a more detailed list of organizations and resources that municipalities can consult during the implementation of full accrual accounting.

## Chapter I: Determining Service Needs

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### I.1 Overview

A challenge that all utilities face is defining what should and should not be included when measuring the cost of services provided. It is useful to consider this challenge from both accounting and utility management perspectives. Accounting is concerned with recording and reporting past transactions. It is focused on reporting the financial position at a particular point in time and changes in financial position over an accounting period. In contrast, a utility management perspective not only focuses on the impacts of historical transactions, but must also take a forward-looking approach to planning for financial sustainability.

There are many different costs, both capital and operating in nature, associated with planning, building, and operating water and wastewater systems. Many costs, such as day-to-day labour expenses, are obvious and relatively easy to identify and measure. Other costs, however, such as those associated with providing capital infrastructure on a long-term basis, may be less obvious and/or more difficult to estimate. Such capital costs can constitute a large percentage of overall system costs. So, careful consideration of such costs is an important part of any financial planning exercise.<sup>4</sup>

Some other costs associated with a municipal water and wastewater utility are arguably not attributable to the provision of municipal water or wastewater services, but rather reflect other service outputs. Prime examples include costs associated with fire protection services or with the operation of combined storm/sanitary sewer systems. Each warrant special consideration and both are discussed further in Chapter II.

### I.2 A Conceptual Building-block Approach to Determining Utility Needs

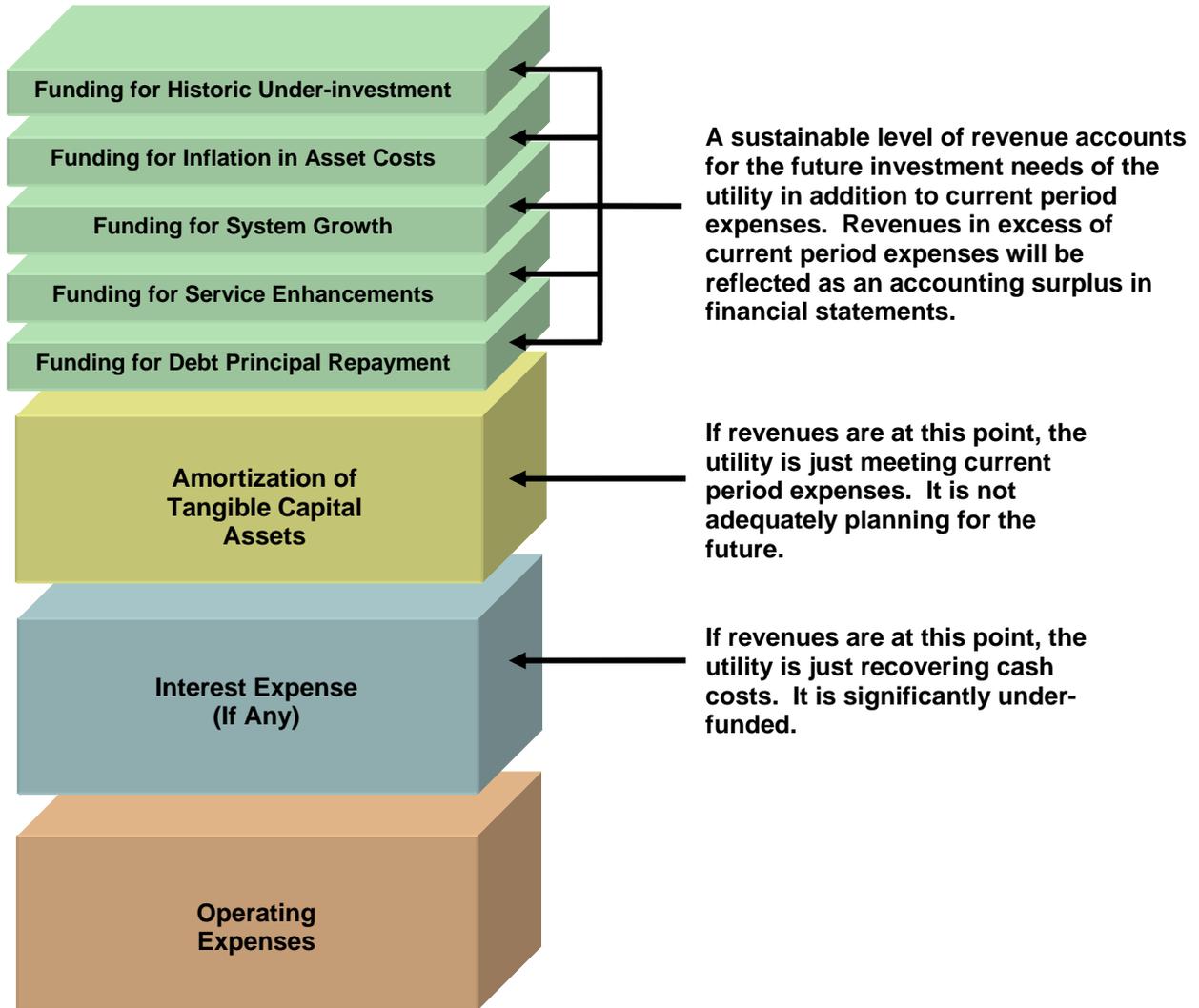
Figure 1-1 depicts a conceptual building-block approach to thinking about cost that includes four distinct components. Utilities may wish to consider this framework when estimating system costs, and the corresponding level of revenue needed to support system sustainability over time. The various

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<sup>4</sup> From an accounting perspective, cost is an expense that is allocated to an accounting period. Thus, the cost associated with a capital expenditure is the series of amortization charges allocated to accounting periods over the asset's useful life. The accounting definition of cost is much narrower than a lay person's interpretation of "cost", where cost may mean either a capital expenditure or an expense in a particular period. This Guideline will generally use the term cost from an accounting perspective.

components represented are summarized below, and discussed in more detail in subsequent chapters.

**Figure 1-1 – A Building-block Approach to Determining Utility Needs**



### **1.2.1 Measuring Current Period Expenses**

The bottom three components make up an accounting view of cost under full accrual accounting; that is, they are the costs measured by the accounting system of the utility. These include operating costs, debt interest expenses, and tangible capital asset amortization. Added together, the three components constitute current period expenses. For any given period, a utility that is generating more revenue than these costs combined will show a positive net income (i.e. a surplus) for that period from an accounting perspective. An

accounting surplus, however, is not in and of itself necessarily indicative of financial sustainability.

Once full accrual accounting has been implemented and financial statements are prepared in accordance with accounting standard PS 3150, information that identifies current period expenses should be readily available from the financial records of the municipality. This information will also be reflected in audited municipal financial statements and Financial Information Returns beginning in the 2009 fiscal year.

The three components of cost making up current period expenses constitute the total expenses of the utility, a reporting requirement of the Financial Plans Regulation as outlined in Part I of this Guideline. The annual accounting surplus or deficit is calculated by subtracting current period expenses from period revenues. The accumulated surplus is found by adding the period surplus or deficit to the previous accumulated surplus or deficit. Chapter IV of this Guideline includes a detailed example with sample calculations.

#### *1.2.1.1 The Change in Approach to Identifying Capital Expenditures*

Although the segregation of capital and operating items may still occur for budgetary purposes, once full accrual accounting is in place, any capital expenditures will ultimately be reflected as an amortization expense. Such expense will be allocated to the periods in which the associated asset is used, and will appear on the municipal statement of operations for financial reporting purposes. On the statement of operations, amortization expense is listed just like any other type of operating expense. The intervening step in determining amortization expense, which has also been introduced with full-accrual accounting, is the creation of an asset on the utility's balance sheet that is equal to the capital expenditure.

Amortization expense is a non-cash expense, which means that it does not correspond to a cash outflow in the period to which it is applied. Amortization, instead, reflects the allocation of a prior capital expenditure that has been recognized as an asset on the utility's balance sheet. There are a number of other expense items that may be included in current period expenses and that do not correspond to a cash outflow within the period. Expenses associated with future employee benefits may have this characteristic.<sup>5</sup> The additional cash flow that occurs when revenues are collected to cover these non-cash expenses can be taken into account in the utility's capital funding process.

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<sup>5</sup> Such expenses create a liability on the utility's balance sheet. However cash outflows associated with this liability may not occur until well into the future.

### *1.2.1.2 Limitations in Accrual Measures of Current Period Expense*

The presence of an accounting surplus in utility financial statements does not necessarily indicate financial sustainability. While a surplus is clearly better than a deficit, any given accounting surplus may not be large enough to provide for future asset repair and replacement.<sup>6</sup> As noted in Part I, the implementation of full accrual accounting is not designed to define current and future funding requirements. Current period expenses indicate the *minimum* amount of revenue that needs to be collected to avoid showing an accounting deficit. Where utility revenues are less than these current period expenses, the utility is most likely under funded, and accordingly, operating in an unsustainable manner.

Therefore, while current period expenses provide a substantial and useful method of determining utility needs, this is not the complete picture. Additional methods that look forward and anticipate future investment needs are critical to achieving financial sustainability for two important reasons:

1. Current period expenses, including amortization expense, may be understated because of deferred maintenance and/or past under-investment in capital assets.
2. Even in the absence of past under-funding, amortization expense within current period expenses is based on historic cost, and will not reflect increased costs of replacement in the future.

These issues are elaborated more fully below.

### *1.2.1.3 A Scenario with Past Under-funding*

A full accrual view of cost does not account for deferred maintenance (i.e., maintenance that should have already taken place), except in cases where it shortens the useful life of the asset and the annual amortization expense has therefore been increased. Nor do current period expenses account for historic under-investment in tangible capital assets.

There is an estimated \$78 billion in municipal water and wastewater assets in Ontario. It is estimated that nearly half of this asset base needs to be replaced over the next 15 years. Revenues that cover only current period expenses, as measured using accrual accounting, will not be sufficient to address short-to-medium-term asset replacements. Deferred maintenance and historic under-investment must be taken into account. This accounting correction must be reflected in water and wastewater system financial planning as early as possible.

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<sup>6</sup> A deficit occurs when current revenues are less than current period expenses, measured from an accounting perspective.

Under-investment occurs when a utility does not replace its assets on a timely basis. This results in an accumulated backlog of capital expenditures, which then need to be made over a short period to ensure system reliability. Past under-investment will generally mean that current amortization expense, measured under accrual accounting, will be less than what would be reported if assets had been replaced when appropriate. This lessens the indicative value of current period expenses when determining required utility revenues.

An ongoing pattern of no or minimal municipal water-reserve account balances may have the effect of deferring timely maintenance, rehabilitation or replacement of assets, and may also be an indicator of historic under-investment.

Deferred maintenance occurs when a utility does not spend enough on maintenance and repairs. This can result in deteriorating asset condition, and escalating future repair and replacement expenditures. If a utility still defers needed maintenance expenses today, then reported maintenance expense may be less than an appropriate level of expenditure going forward. Insufficient maintenance in the past may also result in shorter asset life, and this may not be fully reflected in initial accounting estimates of asset life. Deferred maintenance can result in the under-statement of both current operating expenses and of amortization expense. If a utility needs to increase maintenance expenses and to invest in new assets to make up for past under-funding, the result can be a substantial increase in funding requirements. This additional funding requirement is shown as the first "slice" within the top section of the building block approach in Figure 1-1.

#### *1.2.1.4 A Scenario with No Past Under-funding*

As mentioned in Section 1.2.1.2, amortization is not a good predictor of future capital expenditures and funding requirements, even in a scenario in which there has been no past under-funding. Amortization is not a good predictor because the cost of a new replacement asset will generally be much higher than the original asset's cost. This increase simply reflects price inflation, and in capital costs, over time. The additional funding needed to cover asset cost inflation is shown as the second "slice" within the top section of Figure 1-1 (the top section corresponds to the accounting surplus).

Additional capital expenditures are also needed to reflect growth in the utility, the need for additional infrastructure, and for changes in technology and standards (which can be viewed as service enhancements). These funding needs are shown as the third and fourth "slices" within the accounting surplus portion of Figure 1-1.

All these factors tend to increase requirements for capital spending, relative to historic cost and hence relative to accrual estimates of amortization expense. Finally, the bottom “slice” labeled “funding for debt principal repayment” highlights the fact that existing and future debt will need to be repaid, and the principal portion of debt service payments will not be reflected in an accrual accounting measure of current period expenses. These factors point to the need to show an accounting surplus over time on an accrual basis. Taking into account future replacement costs and debt repayments in determining the appropriate level of the surplus is a crucial step towards financial sustainability.

In practice, many utilities may already be collecting revenues in excess of current period expenses, measured on an accrual basis. The example above highlights the fact that these utilities should not lower their revenues to match current period expenses, once accrual accounting has been implemented. Some level of accounting surplus is likely to be both appropriate and required.

**Note:**

*The municipal transition to full accrual accounting is a key step in achieving financially sustainable water and wastewater services. By itself, however, full accrual accounting does not ensure financial sustainability.*

### ***1.2.2 The Appropriate Level of Accounting Surplus***

For any utility, the key step in financial planning is to identify an appropriate level of accounting surplus and the revenues required to generate this surplus. Accounting surplus is simply the difference between current period revenues and expenses. Identifying the the appropriate level of surplus must be done as a long-term, forward-looking planning process that takes into account future capital investment needs.

Given that the accounting surplus is designed to address capital needs, it is recommended that revenues associated with the surplus only be used for one of the following three purposes:

1. Funding capital expenditures in the current period. Under full accrual accounting, the assets acquired would be capitalized and expensed over their anticipated useful life.
2. Making principal repayments on existing utility debt. Doing so will reduce outstanding debt and future interest payments, but may necessitate further debt issuance to finance future capital expenditures.

3. Making contributions to reserve accounts to accumulate funds to pay for deferred maintenance, to replace assets at the end of their useful lives, and/or to plan for the impact of inflation and growth.

The following chapters illustrate how an appropriate level of surplus can be determined.

### **I.3 Contributions to Municipalities**

Another possible use of utility revenue is periodic or regular contributions to the municipality. A contribution to a municipality is a transfer of water-related revenues collected by the utility to other municipal services, such as public transit or roads. Diverted revenues can either be those collected in the current period, or those collected in the past and kept in non-dedicated municipal funds.

Municipalities should consider using water-related revenues exclusively for the needs of water-related services. This can be done by establishing dedicated reserve funds, in which excess utility revenues above current cash costs and capital expenditures are saved for future utility needs.

This Guideline recognizes that municipalities may value the flexibility that arises from being able to use utility funds for other municipal purposes. Where transfers to a municipality are made, however, sufficient additional revenue should be collected from ratepayers so as not to jeopardize the financial sustainability of the system in the future. A utility that transfers funds to the municipality for purposes unrelated to water or wastewater services will have to charge higher rates and show a higher accounting surplus, than a utility that does not make such transfers. This will have the undesirable effect of making water or wastewater services more expensive to consumers.

If a municipality wishes to use funds from its water or wastewater service to subsidize other municipal services in the short term, ideally it should return those funds to the utility at a later date. This will help replenish the utility's cash reserves, helping to ensure that no net subsidization occurs in the long-term. The funds should also be returned including interest that is at least as high as the investment income that would have been earned by the utility if these funds had been kept in a dedicated reserve account.

***Principle #3:***

*Revenues collected for the provision of water and wastewater services should ultimately be used to meet the needs of those services.*

## **I.4 Proposed Step-By-Step Approach**

The remainder of this Guideline outlines a step-by-step approach to preparing a Financial Plan. These steps, and their corresponding chapter references, are as follows:

1. Forecast future period expenses for water and wastewater services over a projection horizon. (See Chapter II)
2. Forecast the capital expenditure needs associated with asset replacement and renewal (Chapter III)
3. Forecast capital expenditure needs associated for service enhancements and growth (Chapter III – Sections 1.10 and 1.11). Steps 2 and 3 together will address utilities' need to prepare a Capital Investment Plan.
4. Identify their funding requirements, taking into account expected future period expenses, planned capital expenditures, and revenues generated through current rate levels. Utilities should identify how any additional necessary funds will be raised, whether through user rates, existing cash resources, or external debt. This will be referred to as a Funding Plan, within a utility's Financial Plan. Decisions on the source of funds will identify the required level of surplus in utilities' financial statements. (Chapter IV)
5. Design rate structures that collect the needed revenues from consumers to meet the Funding Plan developed in Step 4. (Chapter V)

## **Chapter II: Current Period Expenses**

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This Chapter discusses the make-up of current period expenses at a water or wastewater utility. This includes the relationship between capital expenditures and amortization expense under new accounting rules for Tangible Capital Assets. As an input to the preparation of Financial Plans, this chapter also provides guidance on forecasting period expenses into the future. Thus it addresses Step 1 of the Five Step approach to preparing a Financial Plan.

### **II.1 Operating Expenses**

Operating expenses are generally ongoing expenses associated with providing service. They are straightforward and are typically outlays that need to be made to keep the operation running on a day-to-day basis. In general, operating expenses are easily identified, measured, and verified (or audited) as they are based on actual cash outlays and liabilities.

Items included in operating expenses typically include wages, benefits, source water protection planning costs, chemicals, energy, system maintenance, interest expense, goods and services, and customer care activities (e.g. billing, collection and call centre operation). Provision for bad debt expense and any applicable taxes are also included. .

Where appropriate, operating expenses may also include an allocation of costs for services provided to a utility by a municipality. These overhead expenses can include:

1. Charges for office space used by utility staff.
2. A reasonable allocation of administrative support service costs, such as Human Resources, Legal, and Finance.
3. A share of insurance premiums paid by the municipality if the utility is covered by the municipality's policies.

The following types of costs should be excluded from operating expenses:

1. The operating costs of municipal council.
2. Any other costs that can not be linked, either directly or indirectly, to the operation of the water and wastewater utility.

## **II.2 Interest Expense**

Interest expense includes the interest on existing utility debt, and on that portion of municipal debt that can be directly attributed to expenditures on water and wastewater infrastructure. Under accrual accounting, interest expense does not include the repayment of debt principal. Any principal repayments need to be funded from the utility's accounting surplus.

## **II.3 Amortization of Tangible Capital Assets**

Amortization is a non-cash expense that reflects the gradual wearing-down or consumption of tangible capital assets (TCAs). The annual expense is based on the historic cost of the asset, which is apportioned over the useful life of the asset using a depreciation method. To consider a simple example, the annual amortization expense of an asset that had an installed cost of \$1 million and a useful life of 50 years would be \$20,000 per year using the straight-line depreciation approach. There are a number of accepted methodologies for defining useful life, including years or total expected units of production. Note that this treatment differs from current municipal accounting practice, whereby expenditures on tangible capital assets are recorded as current period expenditures, and then disappear from subsequent financial statements.

Choices about the expected useful life of assets and the method of depreciation can have significant impacts on the cost of water and wastewater services. Once useful lives have been estimated and an amortization method has been selected, PSAB requires the method be applied consistently, and the remaining useful lives be reviewed regularly, so that amortization can easily be verified or audited.

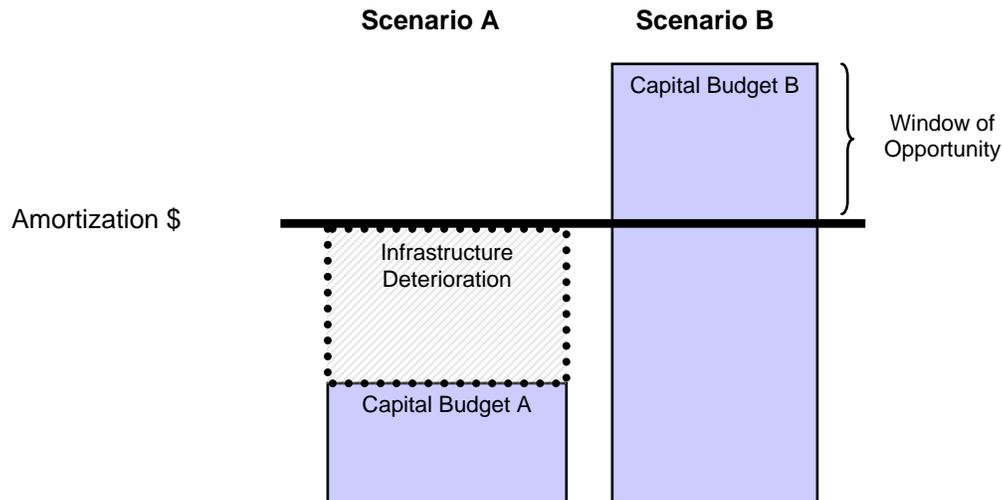
If a utility's current capital expenditures are less than its future amortization expense under accrual accounting, then the implementation of accrual accounting may result in a financial shock. In other words, current period expenses, as measured under accrual accounting, will be higher than similar expenses measured under current municipal accounting practices, where capital outlays are treated as current period expenditures. If rates are simply set as equal to current period expenses, then they will have to increase so the utility will not show a deficit. More seriously, the fact that a utility is spending less than its amortization expense is an indication that the utility is wearing down its infrastructure assets, and building an infrastructure deficit.<sup>7</sup> The annual contribution towards this infrastructure deficit is shown as the shortfall labeled "infrastructure deterioration" under Scenario A in Figure 1-2 below.

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<sup>7</sup> In those limited cases in which assets do not need to be replaced, a level of spending that is lower than amortization expense may be appropriate. It can also be appropriate when all assets within a water or wastewater system are very new and no assets have reached their target replacement date.

It is important to note that amortization, as a current period expense, can not be financed through the issuance of long-term debt under Section 413 of the *Municipal Act, 2001*. Therefore, a utility confronted with Scenario A can not rely on debt financing to meet its amortization expense over the long term.

**Figure 1-2: PSAB Transition Scenarios**



For a utility that is now spending more than its future amortization expense, the implementation of accrual accounting may result in a financial position, reported, in period income statements that appears more favourable than current statements (Scenario B). As noted in Chapter I, however, this situation does not necessarily mean the utility ought to reduce its rates or its level of capital expenditures. Capital expenditure plans should be based on a forward-looking assessment of utility financial needs, rather than on the goal of matching amortization expense. The fact that utility capital spending is higher than amortization expense is positive, but not in itself sufficient to conclude that capital spending levels are adequate.

## II.4 Summary of Current Period Expenses

The following are appropriate costs to include in the calculation of current period expenses:

1. **Direct operating costs:** Reported direct operating costs include electricity, chemicals, operational planning and labour, with electricity, chemicals labour and other direct costs reported on separate lines because of their significance in the cost structure of water and wastewater utilities. Direct operating costs may include general and administrative expenses incurred within an entity providing water and/or wastewater services, and related solely to those services.

Operating costs also indicate the cost of obtaining municipal drinking-water licences, compliance with drinking-water quality and environmental protection requirements, and other appropriate environmental compliance costs.

2. **Source protection costs:** As noted in Part I of the Guideline, Financial Plans may include costs related to source protection planning and implementation. These costs can include consultation, training, studies, education/outreach, land acquisition and easements, policy/by-law development, incentives and any other costs that utilities incur to develop or implement source water protection plans required under the *Clean Water Act*. source protection activities may involve capital investments. For example, an existing well may need to be relocated if it is more cost effective than implementing source protection measures. These types of investments would be reflected in current period expenses as amortization expenses if they are capitalized, or as a one-time current period operating expense if they are not.
3. **Supply and wholesale costs:** Reported supply and wholesale costs include charges paid to wholesalers of water and wastewater service provision. For example, a lower-tier municipality may purchase bulk treated water from an upper-tier municipality.
4. **Overhead costs:** Utilities can include an allocation of municipal overhead costs to reflect any administrative and support services received from their municipal owner. Where such overhead costs are related to a variety of municipal services or activities, the municipality should provide an appropriate and defensible basis for allocating such costs across different functional areas. This includes providing appropriate allocations between water and wastewater services, where both service areas are recipients of this municipal support.
5. **Amortization expense:** As discussed above, reported amortization expense based on historic cost is a substantial constituent of current period expenses.
6. **Shared service costs:** Reported shared service costs include billing and other shared service costs, allocated appropriately across the client base of the shared service provider. For example, a wastewater utility may receive billing services from a water utility.
7. **Cost of debt (interest):** Reported cost of debt includes interest expense on all water service debt, but not repayment of principal.
8. **O&M/DBFO contractor costs:** Reported contractor costs for O&M (Operations and Maintenance) or DBFO (Design-Build-Finance-Operate) contractors include costs paid to such contractors.

## II.5 Issues in Coming to Current Period Expenses

### *II.5.1 A Three Service Approach*

Separation of cost among services is consistent with a user-pay philosophy. Rates based on the user-pay principle are desirable as user benefits are then allocated proportionally to the system costs associated with each user group. In order to implement the user-pay principle, cost and/or service information is required at the service-by-service level. Here is some guidance on how to separate costs associated with water, wastewater, and storm water services, including possible breakdowns for accounting purposes.

In practice, the production of wastewater is closely linked to the consumption of treated water. Much of the water supplied to residences and businesses for cleaning, for process use, and for sanitary uses is returned to the wastewater system. Accordingly, many municipalities pay for the costs of wastewater services by levying a surcharge on water rates. This is a much simpler approach to cost recovery based on the user-pay principle than trying to meter wastewater volumes received from individual properties.

Where a business does not return much of the water that it consumes, as would be the case for a brewery, it may be possible to obtain relief from wastewater surcharges by demonstrating wastewater production is less than water consumption, by installing a meter or other monitoring device. In other cases, a business may create higher loads for a wastewater plant than would be implied by its water consumption alone. For example, food processing or industrial plants may discharge wastewater containing higher-than-average levels of waste materials. The additional treatment costs associated with this wastewater can be met with special surcharges linked to wastewater condition.

In contrast to wastewater, storm water is generally not linked to water consumption, but reflects the discharge of rain water and melting snow from properties and roads. Accordingly, storm water production for any given property is closely linked to the size of the lot and its condition. Relevant conditions include whether roofs drain to the storm sewer system or to the ground, and whether the property has permeable or impermeable surfaces. Moreover, a significant portion of storm water comes from municipal roads, and is not directly linked to individual properties.

Because storm water is typically not linked to water consumption, recovering the costs of storm water services through surcharges on water rates does not satisfy the user-pay principle.

*In the face of significant storm water service costs, some American municipalities have established separate storm water utilities. These utilities are responsible for storm water treatment and collection, and collect revenues through levies on property holdings. The levies are related to lot size and characteristics. Where levies take into account the condition of the lot (e.g. paved or unpaved), this approach can provide an appropriate match between the burden that a property puts on the storm water system and the levies applied. It also provides incentives for property owners to develop their property in a way that minimizes storm water outflows.<sup>8</sup> The key benefit of the storm water utility approach is that it provides a revenue stream that can be dedicated to storm water management, and costs and revenues are segregated from other municipal activities.*

In light of the discussion above, utilities may wish to consider structuring their accounts so that costs and assets can be identified on a segmented basis for each of the following activities:

1. Water
2. Wastewater
3. Storm Water

Under this structure, all common and overhead costs would be allocated to these segments so that each can be reported on a fully allocated basis. This allows for costs to be recovered on a user-pay basis. It is worth reiterating that, as discussed in Part I, there will still be advantages to integrated planning of all three streams of service, even if their costs are segmented.

Some utilities may have wastewater and storm water sewers that are combined in certain areas. Utilities may also refer to these systems as sanitary and storm water sewers, respectively. Where this is the case, it is reasonable to include the costs of that portion of the storm water system that is combined with the wastewater system within the wastewater segment. This reflects the practical difficulties of separating costs for jointly provided services. All costs associated with stand-alone storm water sewers, however, should still only be included in the storm water segment.

Costs associated with the three services can be further broken down into the following sub-segments for accounting purposes:

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<sup>8</sup> More information on storm water utilities can be found in *Financing Stormwater Facilities*, a 1991 publication from the American Public Works Association.

1. Water Costs
  - Water Treatment
  - Bulk Water Purchases
  - Water Distribution
2. Wastewater Costs
  - Wastewater Collection
  - Wastewater Treatment
3. Storm Water Costs
  - Storm Water Collection
  - Storm Water Treatment.

If it is practical, common and overhead costs within each service area should be allocated to the respective sub-segments so that the costs of activities can be reported on a fully allocated basis. Some utilities, however, may prefer to report common and overhead costs only at the level of overall service (i.e. wastewater services). Thus, for example, this Guideline would not expect utilities to allocate financing and interest costs to individual activities or sub-segments.

### ***11.5.2 Fire Protection Costs***

All costs borne by a water utility, both operating and capital, associated with providing fire protection services can potentially be included in the cost of providing water services. Separating fire protection costs from other system costs is desirable, however, to enable utilities to choose whether to fund fire protection costs out of general municipal revenues or directly from water ratepayers.

Some costs associated with providing fire protection service are easily identifiable. For example, the installation and maintenance of fire hydrants are activities that relate directly to fire protection services. If the municipality wants, these costs can be easily segregated from other costs and thus charged to municipal general revenues rather than collected from water users.

Other costs related to fire protection services are less obvious, and are related to assets that are jointly shared with the water services provided by the utility. For example, a distribution main on any given street may be sized larger than it otherwise would be in order to provide capacity to meet potential fire-fighting requirements (enabling firefighters to draw much larger quantities of water than required to meet normal peak-day or peak-hour consumer demands). Similarly, a treatment plant may be sized to meet peak-day consumer demands plus an assumed load for firefighting purposes.

On a percentage or proportional basis, the incremental cost of having a larger water main is generally much lower than the associated increase in capacity. Accordingly, in allocating costs to fire-fighting services, two possible approaches are:

1. Allocate only the incremental costs of additional capacity required in distribution mains and water treatment facilities to support firefighting services. (Incremental is evaluated according to the costs of a hypothetical utility that provides water only for end-use consumption.)
2. Allocate the costs of distribution mains and water treatment plants on a pro-rated basis between water service and fire protection, based on each service's contribution to overall capacity requirements.

The second approach would lead to a greater cost allocation to fire protection services than the first. Municipal officials can decide to separately identify the costs of fire protection services in financial accounts or in the rate-setting process.

In considering the capacity associated with fire-fighting requirements, the costs of serving sprinkler systems can also be considered in addition to municipal fire hydrants. If the costs of serving sprinkler systems are appropriately segregated, a utility can design a special rate for customer sprinkler systems in addition to rates that apply to a customer's actual day-to-day water consumption.

The specific methodologies that can be used to allocate costs between fire protection and water services, and to design appropriate rate structures, are complex and beyond the scope of this Guideline. Readers with further interest in this topic may wish to refer to AWWA Manual M1 Principles of Water Rates, Fees, and Charges, published by the American Water Works Association. This document illustrates one approach to allocating costs on a proportional basis between fire protection and other services.

## **II.6 Forecasting Operating Expenses**

Much of the remainder of this Guideline focuses on the process of estimating future capital expenditures. This reflects the fact that utilities typically have considerable discretion in the timing of such expenditures in the short-term. Thus, such expenditures can be curtailed to improve short-term financial performance. In practice, there is also typically some uncertainty about appropriate levels of capital expenditures.

While this Guideline focuses on capital expenditures, forecasts of operating expenses are also an important part of financial planning. Certain of these operating expenses can be very volatile, and past expenses incurred are not necessarily indicative of what can be expected in future.

To forecast current period expenses in future accounting periods, and to identify the cash flow that will be generated from future operations, utilities should give careful attention to forecasting:

1. Future customer demands. Consumer demand can be influenced by utility programs for conservation and demand management, and by growth rates in population and economic activity within the municipality.
2. Repair and maintenance costs. These generally are classified as period expenses, but can dramatically influence the life-expectancy of assets and service quality. They have implications for future capital expenditures, and like capital expenditures, they are subject to considerable short-term discretion.
3. Input commodity costs, such as power and chemicals. These costs can show considerable short-term variation due to external, non-controllable price movements.

Each of these issues is considered in more detail below, with particular emphasis on the needs of water utilities.

### ***11.6.1 Future Customer Demands***

Accurately forecasting total customer demand is a key element of the budgeting process. This reflects the fact that customer demand determines the:

1. Physical size of the system that is required. Expansion of a water treatment plant, for example, may be driven by customer load growth.
2. Consumption of various input commodities, such as treatment chemicals and electricity.
3. Revenue that will be generated under a given rate structure. Typically, revenues are heavily driven by consumption volumes, although there may be a component of user rates that is driven by peak demand (or maximum consumption within a given period).

In characterizing customer demand, two measures are particularly important for a water utility:

1. The total volume of treated water used by customers annually, and which must be delivered by the distribution system. This will determine the annual movement through the water treatment plant and the demand for variable inputs such as electrical power and treatment chemicals. It will also determine electricity requirements for pumping.

2. The maximum daily consumption by consumers. This is a measure of peak demand and, in conjunction with assumed requirements for firefighting, will determine the minimum size of the treatment plant that is required. Treatment plants must be designed to meet peak loads, since only a minimal amount of storage capacity is typically available within a system to smooth out daily or weekly demand fluctuations. For a wastewater treatment plant, peak daily *inflows* are important in determining required capacity.

To accurately forecast load growth, utility managers may find it useful to look at historical consumption trends separately for each major customer class, including residential, commercial, and industrial users. It is generally useful to separate past volume growth into components reflecting:

1. Change in usage per customer.
2. Change in the number of customers.

Separating past growth trends in this manner allows future volumes to be predicted even if underlying trends in customer growth change. Usage per customer can be influenced by programs for water conservation. If residential users are not metered, a drop in consumption per capita can result from a move to meter use. The number of customers will be influenced by municipal official plans and overall population and business growth. Forecasting approaches will be more accurate if these types of specific developments are taken into account, rather than simply extrapolating past volume trends. Existing municipal official plans should be used as the starting point for demand projections.

### ***11.6.2 Repair and Maintenance Costs***

Repair and maintenance costs are ideally considered in the context of an overall asset management approach, as outlined later in this Guideline. For the purpose of this section, it is important to note that extrapolation of past spending levels may not always be desirable. Utilities should consider evaluating whether their spending levels on repair and maintenance are sufficient to ensure that assets are maintained in good condition over their expected useful lives and do not suffer from premature failure.

### ***11.6.3 Input Commodity Costs***

Commodities such as electrical power and chemicals typically account for a large proportion of the operating costs of a water and wastewater utility. Much of utilities' electricity consumption will be driven by pumping requirements, although new treatment processes (such as ultra-violet radiation and ozone disinfection) may also account for an increasing share of consumption.

Chemicals such as chlorine are required for many water and wastewater treatment processes. Fuel such as natural gas may also be required by a utility in order to support process thermal loads and to provide for back-up electricity generation.

Prices for these input commodities have shown significant volatility over the past several years, and this increases the difficulty of the forecasting process. Utilities that sign long-term contracts with stable prices for these commodities may be in a better position to forecast costs and control related financial risks, although longer-term contracts can also entail a price premium.

Because of recent price volatility and because of their importance to overall utility costs, utilities should pay careful attention to forecasting input costs for the commodities noted above. It would be prudent to expect that electricity and natural gas costs will increase at a rate that is faster than inflation, given pressures on the supply of natural gas in North America and changes in the electricity market in Ontario. A utility may also require additional cash reserves to help manage fluctuations in input prices from year to year.

It is reasonable to assume that commodity input costs are largely proportional to water and wastewater throughput. Thus they can be treated as a variable cost in the forecasting process. This highlights the need to accurately forecast customer consumption, as discussed in Section II.5.1.

## **II.7 General Forecasting Approach**

In forecasting costs, it is often useful to consider individual components of cost separately. One approach is to break the operating budget into major line items, and forecast each individually. Relevant line items, some of which have already been discussed above, are likely to include:

1. Salaries and benefits
3. Chemicals
4. Electrical Power
5. Purchased Services
6. Fleet costs (including fuel, repair and maintenance, and lease costs for utility rolling stock)
7. Charges for municipal support services
8. Interest Expense

Salary and benefit costs are largely determined by the size of a utility's work force. Labour costs can be forecast in a straightforward manner by identifying the number of staff and identifying likely wage and salary increases over time.

For many cost components, it may be reasonable to assume increases in line with general price inflation. Forecasts of general price inflation are available from a variety of sources, including financial institutions and economic consulting firms. It can also be useful to take into account known or expected increases in unit costs, where a utility has signed long-term contracts for certain inputs or services or expects prices to increase at a different rate than general price inflation. As noted earlier, certain commodities may increase in price faster than others.

## **Chapter III: Long-Term Capital Expenditure Planning**

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This Chapter addresses issues associated with estimating capital expenditures at a utility. It thus addresses Step 2 and 3 of the Five Step approach for preparing a Financial Plan. This Chapter also discusses the related issues of asset management and approaches to accounting for tangible capital assets. As a first step, however, this Chapter discusses why utilities need to move beyond simply measuring current period expenses when developing their Financial Plan.

### **III.1 The Need to Move Beyond Current Period Expenses**

The previous Chapter described what costs are included in determining current period expenses for a utility and provided guidance on how those costs can be projected. As noted in Chapter I, however, the accounting measure of current period expenses does not adequately account for future tangible capital asset needs. Some amount of accounting surplus will be required to ensure financial sustainability over the long-term. Such surplus can be used to address the impacts of inflation in capital replacement costs, growth, and any historic under-investment. Furthermore, accounting surpluses, when used to build up utility cash reserves, can assist utilities that may have an aversion to debt and therefore wish to fund future investments without debt financing.

Determining the appropriate level of the accounting surplus is not a straightforward task, as will be seen shortly. The role of a utility's Funding Plan is to identify the required surplus in each year of a projection period, while identifying the amount of debt that will be created and the use of utility cash resources. In short, the Funding Plan identifies how needed funds will be raised.

For its part, the amount of funds that a utility needs to raise reflects two variables:

1. Expected expenses in each period of the projection horizon. Such period expenses are made up of the bottom three boxes in Figure I-1 earlier in this Guideline. Forecasting future period expenses corresponds to Step 1 of the Five Step process identified in Section I.4.
2. Expected capital expenditures. Such expenditures are identified in the utility's Capital Investment Plan, produced in Steps 2 and 3 of the Five Step process.

The Capital Investment Plan is a key input to the funding decisions of the utility. This Chapter provides suggestions on how to create a Capital Investment Plan, and also provides an introduction to key topics in asset management. Asset management planning is a key part of the preparation of both the Capital Investment and Funding Plans. Chapter IV is concerned with how to devise a Funding Plan.

A comprehensive Financial Plan identifies all expected costs to be borne by a utility, and the way those costs will be financed. Therefore, the Capital Investment Plan and Funding Plan are two especially important components of this overall Financial Plan.

## **III.2 Preparing a Capital Investment Plan**

### ***III.2.1 Overall Objectives***

The overall objective of a Capital Investment Plan is to provide the utility with a realistic and informed view of capital expenditures needed over time to maintain the integrity and health of its physical infrastructure, and to accommodate growth and new environmental standards. Detailed knowledge of these needs improves the utility's ability to provide high quality services that meet or exceed requirements for environmental protection and drinking-water safety on an ongoing basis. To obtain this level of knowledge, Capital Investment Plans need to be based on a detailed analysis of the utility's asset base. This highlights the desirability of collecting detailed asset information through the PSAB transition, rather than summary information that simply satisfies the minimum requirements under accounting standard PS 3150.

The capital investment planning approach recognizes the potential pitfalls of basing a capital expenditure budget simply on the amount of funding available within a current revenue envelope after other cash requirements are met. This practice can lead to consistent under-funding, potentially compromising the integrity of the physical infrastructure.

The Capital Investment Plan should clearly project the financial position of the drinking-water system regarding the categories of information requested in the Financial Plans Regulation. These categories include non-financial assets that are:

1. Tangible capital assets
2. Tangible capital assets under construction
3. Inventories of supplies
4. Pre-paid expenses

The Plan may also include projections of total financial assets, total liabilities and net debt, as well as changes in tangible capital assets that are additions, betterments, write downs, and disposals. This Guideline recognizes, however, that information regarding these types of actions is often only known just before decisions are made, and thus projections may be less reliable.

### ***III.2.2 Projection Horizon***

It is recommended that utilities adopt a planning horizon that encompasses the entire life cycle of the asset base when they undertake capital investment planning. Using a horizon that encompasses the full life cycle of all assets may not be immediately possible but is a good objective to strive towards over time. In the interim, a planning horizon of at minimum 35 years is desirable, although utilities that have done limited projection work to-date may wish to start with a smaller period of 15 to 20 years. Some utilities already prepare Capital Investment Plans for 100 years or more into the future. The longer the plan, the longer the utility has to consider and accommodate major replacement expenditures.

Capital Investment Plans should be seen as living documents. Inevitably, changes will be required from time to time. As circumstances and assumptions change, and as time passes, a good practice is to update the plans periodically. Ideally, updates would occur annually on a roll-forward basis. In this way, the projection horizon moves forward by one year annually, ensuring the plan covers a consistent number of years at any given time, and the utility maintains a consistent level of foresight.

***Principle #4:***

*Life-cycle planning with mid-course corrections is preferable to planning over the short-term, or not planning at all.*

### ***Case Study:***

*During 2005-06, the municipality of Clearview undertook a comprehensive study to project its long-term water and wastewater capital needs looking out over a 100-year period. The work involved compiling an asset inventory, and establishing the replacement cost and date for each asset. This work proved to be very useful in subsequent planning of water and wastewater rates.*

*“This study has been a useful benchmarking exercise for our community. Looking out over a 100 year timeframe allows us to better plan for contingencies and smooth rates for our consumers over time.”*

*- Susan A. McKenzie  
Chief Administrative Officer, Clearview Township*

### ***Further Reading:***

*Estimates of Replacement Costs for Water & Sewer Infrastructure – Summary, 2006*

<http://www.clearviewtwp.on.ca/media/public%20meeting%20notice/2006%2DEstimate%2Dof%2DWS%2DInfrastructure%2DReplacement%2DCosts.pdf>

*Clearview Water and Wastewater Rate Project – Final Report , 2006*

<http://www.clearviewtwp.on.ca/media/public%20meeting%20notice/2006%2DWater%2DWastewater%2DRate%2DIncrease%2DReport.pdf>

### ***III.2.3 The Different Categories of Expenditures***

In general, planned capital expenditures can be separated into one of three categories:

1. Expenditures needed to replace an existing asset when it wears out or otherwise needs to be replaced.
2. Expenditures needed to enhance service quality. This could include, for example, the installation of new equipment to improve water quality beyond that provided by existing treatment equipment, or the addition of more metering equipment to provide better data on customer usage.
3. Expenditures needed to meet growth in utility output, whether measured in terms of number of customers, service territory or water volumes.

The discussion that follows focuses on the first category only.

### ***III.2.4 Replacement of Existing Assets***

It is likely that most tangible capital assets owned by a utility will eventually need to be replaced – with one notable exception in the form of land. Few assets last indefinitely, an observation that is reflected in the fact that, for accrual accounting purposes, utility accountants, working in conjunction with management, assign an estimated useful life to each asset when acquired. The cost of each asset is then amortized over this life as it is “used.”

In preparing Capital Investment Plans, a very useful starting assumption is that each asset will need to be replaced at the end of the estimated useful life that it is assigned for accounting purposes. In this way, an explicit link is made between Capital Investment Plans and existing tangible capital assets. In order to proceed, this approach requires that utilities have a complete inventory of their assets.

Once the implementation of full accrual accounting has been completed, utilities may find that they have a large number of assets that are fully depreciated. Utilities are required to inventory these fully depreciated assets under accounting standard PS 3150. Indeed, knowledge that some assets are fully depreciated may come only after all assets have been added to the inventory and useful lives assigned based on asset condition and observed life expectancy. An asset that is fully depreciated will now have zero net book value for accounting purposes. However, it is essential to have a record of these assets as they will also need to be replaced, and this replacement will likely occur far sooner than for those assets with remaining estimated useful lives (and thus positive net book value). While accounting assumptions of useful life should match the expected service life of any asset, the existence of fully depreciated assets may result from dispersion in the actual life of individual assets. This issue is discussed more fully later in this Chapter.

In preparing Capital Investment Plans, it is not reasonable to assume that all fully amortized assets will need to be replaced immediately. For planning purposes, however, it is prudent for utilities to provide for the replacement of all fully depreciated assets over some finite time period, perhaps 10 to 20 years. As a starting point, utilities may assume that such fully depreciated assets are replaced in equal increments. It would not be appropriate, however, to assume all such assets will be replaced within 10 years or further in the future. Capital Investment Plans would reflect these assumptions.

Utilities with significant experience in asset management and life-cycle costing may decide to use, in addition, other approaches to estimate appropriate levels of capital expenditure over time. These approaches could look at minimizing life-cycle costs by optimizing repair and replacement cycles. Capital expenditures

can also be set to minimize the risks associated with asset failure. An introduction to asset management is provided later in this Chapter.

In cases where a utility creates its Capital Investment Plan using alternative methods, the assumption that all assets need to be replaced at the end of their respective remaining asset lives for accounting purposes remains equally appropriate, and serves to establish a minimum benchmark level of capital expenditures. As a prudent management practice, utilities may wish to plan for higher capital expenditures than this benchmark level in order to be better prepared for any unforeseen capital needs (such as those due to a premature breakdown).

### ***III.2.5 Municipalities with a declining population base***

A municipality may be experiencing a declining population base and, thus a declining customer base. This may mean that some water utility assets will not need to be replaced or, alternatively, can be replaced with assets that have a smaller capacity. A utility can take this reduction in investment needs into account in its Capital Investment Plan. In practice, however, a shrinking customer base may not significantly reduce a utility's future investment needs. For example, the number of active customers served along a particular street may decline with the abandonment or demolition of some buildings along the street. However, an existing water main may still need to be replaced because some customers remain. While a smaller capacity main may be sufficient, the capital cost savings associated with a smaller main will generally be less.

Municipalities with a declining population base may thus face particular challenges in the financial planning process, because of the loss of economies of scale that is implied in this example of water main replacement. The loss of economies of scale means that savings in future investment needs are unlikely to be proportional to the decline in the customer base.

### ***III.2.6 Estimating Asset Life***

In order to comply with PSAB accounting standard PS 3150, all tangible capital assets must be identified and assigned remaining useful lives. Implementation of this standard may be particularly challenging, because such estimates have not been required in the past for accounting purposes. Accordingly, limited efforts may have been made to-date towards collecting or reviewing data on asset lives. Water and wastewater service utilities face particular challenges in this process:

1. Many assets are buried underground. So, it can be difficult to evaluate the current condition of these assets, and consequently, their remaining life.

2. Many water utility assets are very long-lived. Due to these time horizons, it is difficult to predict precisely how long such assets will last, even when good information is available on the assets' condition. This is particularly the case given that lifespan may also be significantly influenced by local water and soil conditions. Such conditions can, for example, dramatically influence the rates of corrosion of water mains.

As a result of these factors, there is inevitably some uncertainty around estimates of useful life. This uncertainty can be significantly reduced, however, by reviewing and assessing current asset conditions, and by analyzing past experience and failure rates.

Typically, utilities are constrained in the resources that can be devoted to this task. In an attempt to maximize the accuracy of capital expenditure projections, efforts to analyze asset life can be focused on those assets with a large replacement cost, that account for a large proportion of a utility's asset base, or for which asset life is highly uncertain. This will yield large benefits in ensuring appropriate asset life assumptions and correspondingly accurate financial projections.<sup>9</sup>

Unfortunately, uncertainties over asset lifespan can never be entirely eliminated, only minimized. Given this fact, the approach of assuming that assets are replaced at the end of their accounting life for the purpose of preparing capital expenditure projections may seem questionable. In fact, the assumption may rarely be true for any individual asset.

Nevertheless, the proposed approach retains value because:

1. Variations in actual asset service life around the expected life can be offset. This means that while individual assets or even groups of assets may last longer than anticipated, this will be at least partially offset by assets, or groups of assets, that need to be replaced sooner than predicted.
2. The approach assures a linkage between financial statements prepared for financial reporting purposes and projections used for capital budgeting processes. This provides an additional incentive for utilities to ensure that relevant accounting assumptions are appropriate. Asset life assumptions will also be subject to scrutiny by a utility's auditors.

PSAB accounting standard PS 3150 does not contain suggested ranges for the lives of different types of assets. Instead, it simply provides for the review of asset-life assumptions by utilities themselves.

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<sup>9</sup> To ensure reliable service, good asset management practice suggests that utility managers focus on those assets with high risks of failure. There is likely to be significant overlap between those types of assets and the assets identified here.

Table 3-1 below contains asset life ranges for common types of tangible capital assets. The ranges have been developed based on asset life guidelines provided by utility regulators in a number of jurisdictions. They are far from the last word on the subject. In practice, asset lives can be highly dependent on local conditions, such as the characteristics of soil and climate, as well as local experience. Indeed, there may be circumstances where utilities may wish to assign different asset lives to similar assets. Nevertheless, utilities may find the ranges provided here useful as a starting point for their own analyses of this issue. Utilities will want to find the level of disaggregation for asset life assumptions that will best support their life-cycle asset management efforts.

**Table 3-1: Starting Point Asset Life Ranges**

<b>Asset Category</b>	<b>Low</b>	<b>High</b>
Plant	30	50
Structures and improvements	20	50
Collection reservoirs/sewers	40	75
Sewers	40	75
Power generation equipment	20	30
Meters/Measurement devices	15	25
Miscellaneous tools	10	20
Wells and springs	20	40
Water treatment equipment	15	30
Pumping equipment	15	30
Hydrants	50	75
Communication equipment	5	10
Office Furniture and Equipment	10	20
Transmission and distribution mains	50	100
Transmission and distribution mains– fire-fighting capacity	50	100
Reservoirs – fire-fighting capacity	50	100
Services	40	60
Vehicles	5	15
Hardware	3	5
Software	3	5

Utility engineering staff may be best suited to take the lead in identifying appropriate asset life assumptions. When making these assumptions, it is crucial to take into account actual utility experience with particular types of assets, including survival and breakage rates. In this process, it is important to compare the dispersion in actual asset life as well as its expected life.

For example, a utility may find that it has a number of cast iron water mains that are 85 years old. Further analysis, however, may show that these mains represent a relatively small number of survivors among a much larger group of similar mains that were all installed at the same time (i.e. 85 years ago). The other mains have since been replaced due to deteriorating service quality or breakages or leaks. While many of the remaining mains still in service may provide acceptable service quality, this would not in itself justify using an asset life of 85 years or more for all similar cast iron mains. Rather, the engineer would take into account the fact that many similar mains have been replaced at much earlier intervals. The fact that some cast iron mains continue to provide good service at an age of 85 may simply be a reflection of the dispersion in actual service lives that will be experienced by individual assets.

Based on a more holistic analysis, the utility may decide that 70 years is an appropriate assumption for the life of a cast iron water main. Thus the remaining cast iron mains that are 85 years old will have a net book value of zero for financial reporting purposes.

While engineers are well suited to identify the condition of assets, utility accounting staff should participate in the development of asset life assumptions for financial reporting purposes. Utility management should then review all assumptions made during the preparation of financial statements, since initial preparation of such statements is the responsibility of utility management. Finally, during the audit process, outside auditors will confirm that the assumptions used are appropriate and that the financial statements are free of material misstatement. It is important to maintain good lines of communication among these professional groups.

This section does not suggest that utilities replace assets that are still providing useful service just because they have reached the end of their estimated useful life for accounting purposes (and thereby contribute to estimates of required capital expenditures through the methodology). There may be cases where such assets can continue providing safe and reliable service for years to come. But to maintain continuous improvement, as accounting assumptions of remaining asset life change, new assumptions should be reflected in Capital Investment Plans.

### ***III.2.7 Estimating Replacement Costs***

Answering questions around asset lives is a necessary step towards estimating *when* capital expenditures are needed. In order to determine the magnitude of required expenditures, replacement costs must be estimated. This can be achieved using a variety of approaches listed below in declining order of precision.

1. Prepare a specific estimate

2. Use standard costs curves or unit cost data
3. Index historical cost data.

In practice, a utility may wish to use all three of these approaches for different assets in estimating replacement costs for use in its Capital Investment Plan. .

#### *III.2.7.1 Prepare a specific estimate*

For some specific assets, the utility may wish to commission an analysis of the expected replacement cost based on a detailed engineering or costing review. This is likely to be appropriate only for large or very specialized assets, such as wastewater treatment plants or major transmission pipelines, that need to be replaced in the near future. Costs will be incurred to generate these estimates, so this may not be suitable for assets that will not be replaced soon or are not costly.

#### *III.2.7.2 Use Standard Cost Curves or Unit Cost Data*

For many assets that will need to be replaced, the utility may estimate replacement costs by applying standard cost curves or unit cost data. A standard cost curve is a formula that provides an asset replacement cost estimate based on key parameters such as capacity of the asset and key features.

They are typically derived using statistical analysis of cost data from a large number of installations at other utilities. They may be adjusted to account for differences in regional cost and local conditions.

A utility may develop unit cost data on its own for some assets that it installs on frequently. For example, a utility could calculate installation costs per metre length for certain types of water mains based on its own recent experience. The utility can then apply these unit cost factors to estimate the costs of future replacement activities. With good historic data, it is usually a straightforward exercise to forecast future unit costs by applying assumptions about future inflation levels.

#### ***III.2.8 Index Historical Cost Data***

If the first two approaches are not appropriate, an alternative approach to estimating replacement cost is to inflate the original cost of an asset using an appropriate price index that includes inflation in construction or equipment costs since the asset was installed. This approach is less desirable for two reasons:

1. A replacement asset may use a very different technology than the original asset, making the original asset's cost less relevant.
2. It is often difficult to find an appropriate index to account for cost inflation over the intervening period. Commonly available indexes, which measure consumer price inflation, for instance, are not directly relevant to water utility costs as they measure inflation at the economy-wide level. Construction cost indexes, may be too general or not accurately reflect a particular utility's circumstances.

Moreover, in the case of fully depreciated assets, utilities may decide to not estimate the historic cost of the asset for the purposes of complying with full accrual accounting. Although such assets must be included in the utility's inventory, estimating historic costs for these assets may not be productive. Decisions regarding whether to do so may be made by utilities and their auditors.

The indexing approach may be most appropriate for assets that have not seen major changes in technology or are relatively short-lived in nature, because historical cost data is more relevant than replacement costs.

### ***III.2.9 Accounting for Inflation***

The approaches above typically yield replacement cost estimates based on current prices, where what is truly desired for capital investment planning purposes is the expected cost of asset replacement at the anticipated time of its replacement. Yet, cost estimates need to take into account anticipated future inflation to account for historic inflation.

It is reasonable to use a single, global assumption for future price inflation. Thus, a utility could assume that construction and other capital costs will increase at some uniform rate, say three per cent annually, for the next 10 years. Thus, if standard costs curves suggest the asset would cost \$100 million to build today, the expected future cost of the asset is expected to be \$134.4 million. This is calculated as follows:

$$\begin{aligned} & \$100 \text{ million} \times 1.03^{10} \\ & = \$100 \text{ million} \times 1.344 \\ & = \$134.4 \text{ million} \end{aligned}$$

The figure of \$134.4 million is the expected cost in 10 years of an asset that would cost \$100 million today, given a three per cent price inflation over time.

Funding to cover inflation in asset costs should be taken into account in determining the accounting surplus at the utility. This was noted earlier in Chapter I in the discussion of the building block approach to determining utility

needs. As noted earlier, funding to cover inflation in asset costs, and for service enhancements and growth, is not provided through the amortization charge that is recognized in the utility's Statement of Operations. Rather, such funding must generally be provided through the generation of an accounting surplus.<sup>10</sup>

### ***III.2.10 Expenditures for Service Enhancements***

Expenditures to provide for service enhancements can be made entirely on a utility's own initiative to improve service levels, or in response to new regulatory requirements. Sustained close attention must be paid to changes in regulatory requirements that may affect capital investment needs and operational expenses. Expenditures could include, for example, those needed to improve treatment methods at an existing plant, or to install metering equipment.

### ***III.2.11 Expenditures for Growth***

Planned growth may also have important implications for capital investment needs. Utilities may find official plans and growth plans, as well as source water protection plans, helpful in assessing future capital needs. One key expenditures driver will be the addition of new customers, although expenditures needed to meet volume growth by existing customers may also be applicable.

Utilities can simplify the projection process by focusing on net capital expenditures that must be funded by the utility, after taking into account any capital contributions that may be raised through development charges or connection fees. These revenue options are discussed more fully in Chapter V. Also note that the first two approaches to estimating replacement costs discussed above can also be applied to greenfield investment.

## **III.3 Asset Management**

Asset management is the process of managing a utility's asset base, including making appropriate decisions about repair, rehabilitation and replacement. It is very relevant to the capital investment planning process. The subject of asset management is very broad, and a comprehensive discussion is out of scope for this Guideline. Nevertheless, a brief introduction is provided below.

At its core, an asset management plan addresses the following four key questions:

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<sup>10</sup> Debt can be used in the first instance, but repayment of debt principal will also eventually require the generation of an accounting surplus or a direct injection of funds from the utility owner.

1. What assets does the utility have?
2. What is the condition of those assets?
3. What level of service are the assets providing?
4. When will the assets need to be replaced?

In order to answer these fundamental questions, high quality information about infrastructure is essential. This confirms the importance of preparing detailed asset inventories for water and wastewater assets as part of the transition to full accrual accounting.

### ***III.3.1 Single Asset vs. Component Capitalization***

Single asset versus component capitalization refers to the degree of aggregation of assets for accounting purposes, the degree based on a trade-off between accounting simplicity (which supports a high degree of aggregation) and accounting accuracy (which suggests a low degree of aggregation). As its name implies, a single asset approach to capitalization recognizes the entire system of assets as a single asset. In contrast, a component approach breaks down the system into different components. Similar components can then be grouped into classes for capital asset accounting purposes. Thus, for accounting purposes, the network will be divided into asset classes, each representing a type of component.

Although generally requiring more effort up-front and greater maintenance over time, there are many benefits to a component approach. Readers are encouraged to consult the guidance documents on full accrual accounting mentioned earlier in this Guideline for a full treatment of the subject. However, one of the benefits of the component approach is to facilitate better asset management planning. A single asset approach is quite limited in providing a foundation for asset management and Capital Investment Plans.

Comprehensive knowledge of the condition of water and wastewater systems allows utilities to schedule work over a longer period of time and in a more cost-effective way. It also encourages the use of techniques to optimize the management of water services to achieve utility goals for maintaining or improving their systems.

### ***III.3.2 Relationship to Financial Planning***

The initial approach to estimating required capital spending is to assume that assets will need to be replaced at the end of their accounting life. This is a reasonable assumption for estimating total funding needs. Asset management

processes, however, are still needed to help decide when to replace specific individual assets and to help allocate funds within an overall capital budget. Replacement of any individual asset or group of assets should be driven by detailed analysis of that individual asset or asset group. It should not be automatically dictated by financial plan assumptions.<sup>11</sup>

***Principle #5:***

*An asset management plan is a key input to the development of a financial plan.*

In addition to determining the actual dates of individual asset replacement, asset management plans should identify appropriate rehabilitation and repair activities, to maintain or extend asset life and ensure continued service quality. Many of these repair and rehabilitation expenditures will be classified as operating expenses, and thus will not be included in projected capital expenditures.<sup>12</sup> These expenditures will, however, serve to reduce life-cycle costs. Where there has been a significant build-up of deferred maintenance over time, it may not be realistic to assume this can be corrected for through rate increases in one year. A medium-term plan to address deferred maintenance may be required.

***Case Study:***

*Following the amalgamation of Chatham-Kent into a single-tier municipality in 1998, the Municipality developed a Geographic Information System (GIS) strategic plan to organize data on municipal infrastructure into one spatial database. The result is a database that contains detailed information about the municipality's water and wastewater assets. This allows the Municipality to undertake advanced asset management planning that yields strong time and dollar estimates of repair, rehabilitation, and replacement needs for the future.*

*"A good characterization of existing infrastructure is a key input to the financial planning process. The Municipality's investments in asset management tools have not only improved our financial planning capabilities, but yielded a number*

<sup>11</sup> Asset management processes can also inform decisions on the overall level of capital spending, based on a bottom-up analysis of asset condition and lifecycle costing. This Guideline's approach of assuming that assets be replaced when they reach a net book value of zero is provided as an alternative. This recognizes that asset management processes at many utilities may not be fully developed and that, it is useful to have an accounting-based benchmark against which the recommendations of an asset management program can be compared.

<sup>12</sup> Such expenditures will only be classified as capital expenditures if they extend an asset's service life beyond its initial estimated life, or if they result in an enhancement of service potential by way of increased physical output or service capacity, lower operating costs or improved quality of output.

*of operational efficiencies, as well."*

*- Jack Sonneveld*

*Senior Advisor, Chatham-Kent PUC*

***Further Reading:***

Chatham-Kent Water Service

<http://www.chatham-kent.ca/community+services/living+in+chatham-kent/utilities+and+services/water/Water+Service.htm>

Asset management planning is an activity that should be led locally and existing work and practices should be incorporated as appropriate. Central to asset management is the concept of continuous improvement. Asset management plans can include condition assessments plus strategies for data collection, analysis and improving decision-making processes.

### ***III.3.3 Condition Assessments***

It is generally not practical or cost-effective for a utility to monitor the condition of every single asset in its network. It is prudent, however, to know the average condition of similar groups of assets based on some sampling program. This way, a utility will have a basis on which to predict future failure rates and to anticipate and react to likely declines in service quality and performance. Without condition assessments, a utility may be unable to forecast expected replacement requirements. This will jeopardize the effectiveness of its financial planning efforts. Where, in the course of a condition assessment, a particular group of assets, based on age and type, is found to be poor quality more intensive monitoring and/or accelerated rehabilitation and repair may then be in order.

Individual assets at the end of their estimated useful life for accounting purposes merit special attention to ensure they still provide acceptable levels of service and do not demand inordinate maintenance expenditures to keep them functioning. Utilities may wish to consider enhancing performance measurement activities for these assets, particularly those that are critical to the overall operation and safety of the system. Such assets may be candidates for early replacement to lower total life-cycle costs while enhancing service.

### ***III.3.4 Life-cycle Planning***

A key objective of asset management activities is to minimize the total life-cycle asset costs. For certain types of assets, repair and rehabilitation activities can prolong the life of the asset, and postpone the need for replacement. In cases

where the service potential of the asset is enhanced, the activity could be considered a betterment, and would be reported in the utility's Financial Plan. For example, work to reline water mains or to provide cathodic protection against corrosion can benefit water utility infrastructure. An expenditure on upkeep can lengthen life-spans, resulting in net savings overall. In order to minimize the costs of water and wastewater service, prudent utilities plan for an appropriate amount of rehabilitation and repair.

In optimizing life-cycle costs, a common strategy is to co-ordinate capital spending for water and wastewater assets with those for other infrastructure assets. A good example of this is municipal road replacement. Municipal roads need to be periodically rebuilt, and schedules for this are part of the municipal planning cycle. All else being equal, significant cost savings can be achieved if a water or sewer main is replaced at the same time as the road above it is rebuilt. This reduces the additional costs for pavement restoration when water or sewer mains are replaced on their own. Replacement of a water or sewer main, however, is only appropriate if there is a good possibility that it will fail, or start to provide degraded service, sometime during the life of the replacement road that is being installed. Otherwise, replacement of the sewer or water main should not occur until the next road replacement cycle.

### ***III.3.5 Accounting for Water Losses***

An important tool in understanding the condition of assets is a water audit. This is the process of estimating the final disposition of all water that enters the distribution system. The National Guide to Sustainable Municipal Infrastructure includes a best practice document entitled Water Use and Loss in Water Distribution Systems. That document provides a more complete discussion of issues related to water losses and water audits, and should be consulted by utilities that wish to learn more about this topic.

A simple approach to calculating water losses is to subtract billed water volumes from the volume of water that enters the distribution system. This simple approach, however, does not distinguish among different types of "non-revenue water," which is water that is not billed to consumers. Such non-revenue water can include:

1. Water that is used for fire protection or other municipal purposes, such as for street-cleaning or by parks and recreation.
2. Water volumes that are unaccounted for because of meter inaccuracies or unauthorized use.
3. Leakage from transmission and distribution mains.

Table 3-2 illustrates the approach to calculating a water balance that is recommended by the International Water Association (IWA). This diagram shows the inter-relationships among various components of water use, and the elements that make up “non-revenue” versus “revenue” water.

**Table 3-2: IWA Best Practice Water Balance and Terminology**

<b>System Input Volume</b>	Authorized Consumption	Billed Authorized Consumption	Billed Metered Consumption (including water exported)	<b>Revenue Water</b>
			Billed Non-metered Consumption	
		Unbilled Authorized Consumption	Unbilled Metered Consumption	<b>Non- Revenue Water</b>
			Unbilled Non-metered Consumption	
	Water Losses	Apparent Losses	Unauthorized Consumption	
			Metering inaccuracies	
		Real Losses	Leakage on Transmission and/or Distribution Mains	
			Leakage on Service Connections up to Customers' Meters	

From an asset management perspective, the components of the water balance that are particularly of interest are losses arising from leaks in transmission and distribution mains and from leaks in service connections. Leaks can be difficult to detect, since they are generally hidden underground. Individual leaks may be small, but may be widespread. Leaks are of concern for the following reasons:

1. They can be a signal of deteriorating water main condition, and a precursor to more significant breakages that will require immediate (and expensive) water main replacement.
2. They can be the source of bacterial contamination of drinking-water supplies. This can occur when temporary pressure drops occur in the distribution system, causing the inflow of groundwater rather than outflow of treated water at the location of the leak.
3. They result in additional costs for pumping and treating water that is not ultimately delivered to consumers. Such additional costs can include both variable costs, such as power and chemicals, and fixed costs, such as those for additional treatment capacity.
4. They can result in damage to other municipal infrastructure, such as roads and sewers. This can occur when leaking water weakens the surrounding

soil, potentially causing sinkholes at the surface or the collapse of adjacent sewer mains.

Because leaks can cause serious problems, utilities should consider having a process to estimate real losses from its water distribution system. Loss trends, and comparisons with benchmark data from other utilities, can then become an important performance management tool. Loss data can also be used to help quantify the financial costs associated with water leaks. Financial savings from reduced leakage rates can be an important element of the business case for upgrading distribution systems.

*A recent survey of U.S. jurisdictions showed that many states have performance standards for unaccounted-for water. Such standards provide suggested maximum levels for unaccounted-for water, expressed as a percentage of water entering the distribution system. Maximum levels are typically shown as 10 per cent to 15 per cent, with a few states allowing rates as high as 20 per cent. For utilities exceeding these levels, remedial actions are suggested.*

### ***III.3.6 Replacing Lead Service Lines with Safer Materials***

A specific topic related to asset management is the replacement of lead service lines. Historically, lead service lines were frequently used to connect homes with water mains, and lead was also used in the solder for copper plumbing. Although the use of lead service lines has been phased out, they can still be found in older sections of cities and towns.

Justice O'Connor's Recommendation 35 states that: "As part of an asset management program, lead service lines should be located and replaced over time with safer materials." Drinking water that becomes contaminated with lead could have serious health affects. The greatest risk is to young children and pregnant women. It is strongly recommended that utilities locate and replace lead service lines with approved materials.

The location and replacement of lead service lines can be appropriately managed through ongoing maintenance of an asset inventory and management plan. A comprehensive and forward looking asset management plan will assist in forecasting these capital replacement costs. Plus the Financial Plans regulation requires that Financial Plans identify any projected costs directly related to the replacement of lead service pipes.

As part of the 2007 Lead Action Plan, the province is encouraging municipalities to conduct public education campaigns on lead in drinking water. The province is also working with municipalities to help them develop approaches to make it

more affordable for homeowners to replace their portion of the lead service line. To date, a number of Ontario municipalities have introduced these types of programs. Here are some examples:

1. In 2007, the City of Ottawa initiated a pilot program to replace the portion of lead pipe from the homeowners' property lines to the water main connected to the city's water supply. The City will coordinate with homeowners, at their request, to replace lead pipes from the property line to the home, with a deferred payment option added to the tax bill to be paid over five or 10 years. This option includes interest based on the City's borrowing costs at the time the project is completed.
2. The City of Windsor's program charges residential customers a surcharge of 25 cents on their monthly bill. The program is engaged when a leak is identified on the private side of a galvanized or lead service line. The surcharge fund covers the cost of the replacement of the service from the property line to a point two feet from the premise's foundation wall. The cost of the balance of the service replacement into the premise is the responsibility of the homeowner.
3. Many Ontario municipalities offer various other "co-ordination" programs to encourage homeowners to replace their portion of the lead service line. For example, municipalities will offer to co-ordinate with homeowners when the municipality is already undertaking water or road work on their street or when the homeowner requests it. In these circumstances, some municipalities offer homeowners the use of municipal contractors at a discounted rate.

Municipalities can refer to the following resources for more information about lead in drinking water:

1. Health Canada webpage regarding the effects of lead on human health. [http://www.hc-sc.gc.ca/iyh-vsv/environ/lead-plomb\\_e.html](http://www.hc-sc.gc.ca/iyh-vsv/environ/lead-plomb_e.html)
2. Ontario Ministry of the Environment webpage regarding lead and drinking-water. <http://www.ene.gov.on.ca/en/water/tapwater/index.php>
3. The Draft Federal Corrosion Control Guideline. In 2007, the federal government developed a draft guideline on Corrosion Control. While still under consultation, it may be useful to municipalities.

### ***III.3.7 Information Base Resources***

There are existing databases that can assist utilities in storing and managing asset data. For example, the Municipal Infrastructure Data Standard (MIDS) is a set of definitions and rules for storing data on municipal physical infrastructure. For each asset within these categories, MIDS stores information about its type, location, condition, performance, and life-cycle events. MIDS has several potential uses, including asset management, capital investment planning, work

management, decision support, operations, network modeling, and permit control.

MIDS is managed by the Tri-Committee for Utilization of Information Technology in Public Works, made up of the Ontario Good Roads Association (OGRA), Municipal Engineers Association (MEA), and the Ontario Public Works Association (OPWA). It can be purchased for a yearly subscription fee.

## Chapter IV: Funding Plans

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This Chapter discusses how a utility may prepare a Funding Plan, which is Step 4 of the proposed Five Step approach to creating a Financial Plan. A Funding Plan addresses how a utility raises the additional funds needed to address its projected operating and capital needs.

### IV.1 Overall Approach

A sustainable utility is one that can adequately cover current operating costs, maintain and repair its existing asset base, replace assets when appropriate, fund future growth and service enhancements, and account for inflation and changes in technology. Chapters II and III provided guidance on how to identify, measure and forecast the different kinds of costs faced by utilities.

As discussed in earlier Chapters, utilities need to collect revenue to cover the accrual accounting measure of current period expenses (including operational, interest, and amortization expenses) and to provide an appropriate level of accounting surplus, where the surplus reflects needed capital expenditures over time. The first step in determining an appropriate level of surplus is the creation of a long-term Capital Investment Plan. There is no one right answer to an appropriate amount, or stream of amounts, for the accounting surplus. In principle, there are many different possible streams of cash flow over time that can meet the same time profile of capital needs. At the end of this chapter is an example of how to create a Funding Plan.

#### *IV.1.1 Building on Accrual Measures of Cost*

By this point, some readers may have questions about the advantages of explicitly acknowledging the amortization expense (as part of current period expenses) and building on this view of cost for the purposes of determining the accounting surplus. Some might suggest it would be better to rely solely on a Capital Investment Plan as a basis for assessing the revenues that need to be raised by the utility. Let us address these potential concerns.

There are two reasons for proceeding with an approach that links funding needs to current period expenses, including amortization expense, and then to an appropriate surplus level. First, as discussed earlier, amortization expenses are a consequence of full accrual accounting, and are subject to auditor oversight. Capital Investment Plans, however, build on asset inventories and condition assessments that project asset information forward. Forward-looking projections can not be verified or audited in the same way as historic cost amortization. An audited foundation for assessing funding needs increases accountability and

transparency. It can help utility managers and municipal councils defend their Financial Plans and particular funding requirements.

Second, full accrual accounting does not explicitly acknowledge future or anticipated funding needs but rather provides a measurement of the cost of delivering services today (i.e. it is backward looking). Thus, identifying an appropriate level of surplus as a separate component that is added to accrual costs has inherent benefits. The relative magnitude of the accounting surplus as compared to current period expenses can be an indicator of a water service's overall financial position. Current period expenses show the costs that are linked to the utility's existing asset base, while the surplus identifies those associated with the utility's future investment needs. The surplus may need to be relatively larger for those utilities that have been under-funded in the past, although it can also reflect utility decisions in funding future capital expenditures, and a desire to avoid the use of debt.

***Principle #6:***

*A sustainable level of revenue allows for reliable service that meets or exceeds environmental protection standards, while providing sufficient resources for future rehabilitation and replacement needs.*

***IV.1.2 Possible Capital Funding Sources***

Chapter V of this Guideline identifies and describes the types of revenues that are generally available to utilities. It is enough to note in this section that in any given period, capital expenditures can be funded through some or all of the following:

1. Cash flow generated from operations. Such cash flow results when revenues are higher than cash expenses. For example, this will be the case when rates reflect amortization expense, a non-cash expense.
2. A draw on cash reserves. These reserves may be in the form of conventional working capital or dedicated reserve accounts that are designated for capital expenditures.
3. New debt issuance.

In choosing among these funding sources, utilities will necessarily face some constraints. For example, the amount of debt that a municipality can assume is restricted by regulation and, more generally, limited by its ability to meet future debt service payments. For their part, cash reserves are finite and can not be

used further once they have been depleted. The funding sources chosen may also reflect the preferences of the municipality. Many utilities want to avoid the use of debt and, accordingly, need to raise additional revenues from ratepayers today to save for future investment needs.

It is a good practice for the Funding Plan to clearly identify the planned contribution of various funding sources towards satisfying Capital Investment Plan requirements over the projection period. A related best practice is for the Funding Plan to include projected balances for debt and cash reserves in each period of the projection horizon. This implies a need to ensure projected balances are consistent with assumptions on the change in debt and cash reserves in each period, and with projected capital expenditures. Projections should be internally consistent, and funding flows should balance with anticipated expenses and need for surpluses.

The Financial Plans Regulation requires utilities to forecast, among other things, the following:

- Total Financial Assets
- Total Liabilities
- Net Debt
- Total Non-Financial Assets.

In addition, it requires projections of cash flows over time, including the system's projected gross cash receipts and gross cash payments arising from:

- Operating Activities
- Capital Activities
- Financing Activities
- Investing Activities.

Cash used for TCA acquisitions will be included under capital activities category, while funds from borrowing will be included under financing activities. Later in this Chapter a detailed example of a Funding Plan is provided, including sample calculations and statements.

### ***IV.1.3 Key Objectives in Fund Planning***

There are typically many ways of funding the same time profile of costs, both in terms of the timing of incoming cash flows and the types of funding used. Utilities typically eliminate many possible approaches by pursuing the following three objectives:

1. Avoiding large fluctuations in rates from year-to-year. This is best achieved by extending the planning horizon to cover the entire life cycle of the asset base.
2. Keeping debt within a sustainable level and not assuming that historic underinvestment can be entirely corrected for by the issuance of debt.
3. Avoiding depleting cash reserves or, conversely, building up very large cash balances that do not reflect future cash needs.

It is typically not possible for large, one-time capital expenditures to be funded from current revenues alone without a significant additional one-time charge. In these cases, cash reserves built through the collection of an appropriate surplus, or series of surpluses over time, can reduce the need to rely on debt issuance as a means of smoothing rates. The surplus reported in utility financial statements may be high in years preceding the capital expenditure, but should fall once the new asset is installed and its amortization expense is recognized in financial statements from the installation period onward. When sufficient reserves can not be built up prior to necessary expenditures, debt issuance is another alternative for rate-smoothing purposes. The interest on newly issued debt, however, will then form part of the period expenses in subsequent years until the debt matures and is paid back in full.

Rates that fluctuate frequently can cause confusion among consumers, and can send contradictory signals about the true cost of water services. Although very large one-time rate increases may be equally or more unpopular with users, some utilities may find that they are not currently raising sufficient revenues to cover their future needs. Still others may find they are not even covering their current period expenses, and will report a deficit. Such utilities may prefer to raise rates in one large, immediate increment, rather than raise rates in a series of steps. An initial large increase can better enable rate smoothing in later periods.

#### ***IV.1.4 Planning Horizon***

A utility's ability to smooth rates, and more generally to determine the most appropriate and desirable approaches to funding, is considerably improved if it takes a long term approach to both capital investment and funding planning. In the case of Capital Investment Plans, utilities should extend their funding planning horizon to cover the entire life-cycle of the asset base. This way, the replacement of all major assets can be anticipated in funding decisions and, in particular, with appropriate levels of debt and reserves.

The current practice of many utilities is to prepare funding plans over a time frame of five to 10 years. Utilities may view projections beyond this time as

being highly uncertain and not of great value. While it is true that projection uncertainty increases with time, longer-term capital projections can reveal large lumps of investment needs that could otherwise go unnoticed with the standard approach. For example, if a new water treatment plant will be required in 25 years, the utility may wish to start saving for this expenditure now in order to smooth rates and lessen reliance on debt financing at that time. This illustrates the risk of using only short-term projections when planning funding needed to address long-term capital needs.

Utilities moving to longer-term funding planning may wish to build up their forecast time horizons incrementally over time. For example, a utility might start by looking ahead 10 years, with the ultimate objective being 100 years. As with Capital Investment Plans, long-term funding projections may not be perfectly accurate, but it is better to create them well in advance and then make mid-course corrections, rather than only looking forward on a short-term basis. Updating the plans on an annual, roll-forward basis is recommended, so that changes in Capital Investment Plans and other conditions can be immediately addressed. This is consistent with the municipal budget cycle. It makes good sense to update financial plans at the same time, so the results can help inform the budget process. A number of tools are provided below that utilities may use to refine and improve their Funding Plans.

#### ***IV.1.5 The Differing Nature of Capital Expenditures***

When preparing Funding Plans, capital expenditures can usefully be considered to fall into two distinct categories:

1. Those that are large and occur on an intermittent basis. These include expenditures associated with major single assets, such as water or wastewater treatment plants or major transmission pipelines. These types of expenditures typically occur infrequently and merit special attention due to their size. External debt is more likely to be used for expenditures of this kind than for smaller assets.
2. Those that occur on an ongoing basis. For example, a utility may need to replace some portion of its water mains annually, resulting in a base level of capital expenditures. For these types of expenditures, it is more likely that annual cash flow can be used to meet planned expenditures.

The distinction between these two types of expenditures is not always clear. The age distribution of a utility's assets may be such that a large portion of water mains will need to be replaced in a concentrated period of time. This can reflect one or both of the following circumstances:

1. A large group of water mains were initially installed during a short period of time, such as during a post-war construction boom.
2. Many water mains of different vintages and construction materials need to be replaced at about the same time, as a result of convergence in their expected service end-dates.

The concentration of replacement expenditures that result from the above factors may mean that a main replacement program more closely resembles a large single project in terms of its funding implications. Pre-funding through reserve contributions and/or reliance on external debt may play a larger role than would otherwise be expected.

## **IV.2 Possible Funding Plan Calculations**

To supplement the discussion, a number of equations are provided that utilities may find useful in determining required revenues over the projection time horizon. The key parameter that is known, or set, at the beginning of the process is planned capital expenditures, as found in the Capital Investment Plan. For each period within the projection time horizon, the equations can be solved. This means that key parameters can be calculated by inputting those factors that are already known.

### *IV.2.1 Calculating Required User Fees*

For any utility, the total revenue that needs to be collected can be calculated by adding forecasted operating costs to the estimated operating cash flow that is required to meet the Funding Plan, plus any contribution to reserves.

This calculation yields the total revenue to be raised directly from consumers. Rates can then be calculated by dividing total revenue by expected sales volumes (in mega litres or cubic meters of water).<sup>13</sup>

Relationships among these financial parameters can be summarized in the equations outlined in the sub-sections below.

### *IV.2.2 Operating Cash Flow*

The starting point for this analysis is a simple equation that calculates operating cash flow:

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<sup>13</sup> This calculation will likely be more complex than indicated here because most utilities may have a number of different customer classes and may raise rates from each through a combination of customer and volumetric charges. Furthermore, some revenues may be derived from sources other than user rates. .

$$\begin{aligned}
& \text{Operating Cash Flow} \\
& = \text{Revenues} \\
& - \text{Operating Costs (excluding amortization)} \\
& - \text{Debt Service on Existing Debt}^{14}
\end{aligned}$$

This equation shows that current period operations can generate either a surplus or deficit from a cash perspective, depending on the balance between revenues and cash expenses.

#### *IV.2.3 Capital Expenditure Balance*

Another important “identity” is the calculation of the cash that is available for capital expenditures. An identity is the relationship among various parameters, expressed using an equation. The equation that identifies cash available for capital expenditure, referred to as Equation 2, is as follows:

$$\begin{aligned}
& \text{Cash Available for Capital Expenditures} \\
& = \text{Operating Cash Flow} \\
& + \text{Contributions } \textit{from} \text{ Reserves and Cash Balances} \\
& - \text{Contributions } \textit{to} \text{ Reserves and Cash Balances} \\
& + \text{New Debt Issuance} \\
& + \text{Other Sources of Capital Funding (see Chapter V)}
\end{aligned}$$

Equation 2 shows that cash available for capital expenditures is the sum of operating cash flow, identified from Equation 1, new debt issuance, and net contributions from reserve funds.

Equation 2 can be re-ordered to calculate how much funding a utility needs to obtain from current period revenues for capital expenditures. A re-ordering of Equation 2 yields:

$$\begin{aligned}
& \text{Required Operating Cash Flow} \\
& = \text{Planned Capital Expenditures} \\
& + \text{Desired Contribution } \textit{to} \text{ Reserves and Cash Balances} \\
& - \text{Desired Contributions } \textit{from} \text{ Reserves and Cash Balances} \\
& - \text{Planned Debt Issuance} \\
& - \text{Other Sources of Capital Funding}
\end{aligned}$$

This equation shows the cash flow from operations that the utility needs to generate in order to meet its financial targets for capital expenditures from its Capital Investment Plan. The calculation takes into account the targets for reserve contributions and withdrawals, planned reliance on debt, and other

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<sup>14</sup> For simplicity, changes in non-cash working capital balances in the equations presented are ignored.

sources of capital funding. In the equation above, plans for debt issuance reduce the amount of cash that needs to be generated from operating cash flow. This reflects the fact that issuing debt is a source of funds in the short-term. Cash withdrawn from reserve accounts has the same effect.

Next, by re-ordering Equation 1, required revenues can be derived based on targets for operating cash flow and expected operating costs as follows:

$$\begin{aligned} & \text{Required Revenues} \\ & = \text{Required Operating Cash Flow (from Equation 2)} \\ & + \text{Expected Operating Costs} \\ & + \text{Debt Service on Existing Debt} \end{aligned}$$

It can be seen that many parameters are at the municipality's discretion. For example, desired contributions to (or from) reserves are not fixed. Unlike some other elements of financial performance, appropriate contributions can not be simply identified from accounting statements. In contrast, for example, required- debt principal payments may be clearly identified in loan agreements.

Once required revenues are known, the utility can work backwards to identify a rate structure that can raise these revenues, given expected sales volumes. Where rate increases over time are significant, utilities may wish to reduce expected sales volumes to take into account the effect that increased prices may have in reducing demand. Where price increases cause demand to be reduced, additional price increases may be required to generate target revenue.

Although increased water rates may result in some reduction in consumption volumes, there should nevertheless be an increase in total revenues. Reductions in volumes will not be fully off-setting. This reflects the fact that overall demand for water is likely to be *in-elastic*, meaning that the change in demand, measured as a percentage, is likely to be much smaller than the change in price, also measured as a percentage. This contrasts with services that are price *elastic*, where an increase in price leads to a decrease in revenue. In-house residential consumption is likely to be particularly price in-elastic. In comparison, seasonal lawn watering loads and commercial and institutional consumption are likely to be elastic, and thus more influenced by price increases.

The equations above can be solved in each period of the projection horizon. In order to do so, the underlying parameters also have to be determined for each of the periods. The following example outlines this process:

### **IV.3 The Funding Plan: A Hypothetical Example**

For the purposes of explanation, the parameters of the example are kept simple. For example, a projection horizon of 10 years is employed, notwithstanding

recommendations earlier in this Guideline to plan on a life-cycle basis. The minimum regulatory requirement is for a projection horizon of six years. To differentiate this horizon from the 10-year horizon used in the example, the final four years are shaded.

The numbers used in the example are purely hypothetical, but are designed to provide realistic relationships among various income statement and balance sheet items.

Consider a utility that, in the base year of 2007, has financial variables as follows:

Revenue:	\$4,000
Operating Expenses:	\$3,750
Amortization:	\$1,000
Cash Reserves:	\$1,200
Fixed Assets:	\$25,000

It is assumed the utility has just implemented accounting for tangible capital assets. The utility determines that its existing assets have a Gross Book Value of \$50,000, but have been depreciated by half. Thus, they have a Net Book Value of \$25,000. For simplicity, all assets are assumed to have a 50-year life. Revenues do not fully cover operating expenses plus amortization, and are thus below acceptable levels. No capital expenditures are assumed in 2007.

Based on its Capital Investment Plan, the utility has identified capital expenditure needs as outlined in Table 4-1. Capital expenditures vary between \$1,500 and \$2,100 annually, levels significantly higher than the utility's initial depreciation expense. The one exception is 2013, when capital spending jumps to \$15,000. The \$15,000 is assumed to be required for a large one-time capital expenditure on a water treatment asset.

**Table 4-1: Capital Expenditure required over 10-year period**

Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Capital Expenditure (\$)	2,000	1,875	1,500	2,000	2,100	15,000	1,750	2,000	1,500	2,000

*Step 1: Financial Results Using Existing Rates*

As a first step, the utility looks at whether maintaining existing rates will be sufficient to meet cash requirements over the 10-year period. For simplicity, it is assumed the utility shows no volume growth during the projection horizon. Accordingly, revenues do not increase without an explicit decision to increase

rates. Operating expenses, however, increase by the assumed rate of inflation, which is two percent per annum. Cash balances earn interest of four per cent per annum. For simplicity, negative balances are charged a similar rate.

Table 4-2 shows a simplified flow of funds under existing rates yielding annual revenues of \$4,000 for the utility. Line 10 shows that revenues under existing rates are more than adequate to meet projected expenses if no capital expenditures are required in 2007. The resulting operating cash flow of \$330 increases the opening cash balance in 2008 to \$1,530. With the inflation assumptions indicated however, operating cash flow remains positive only to 2009. This is shown on Line four. In subsequent periods, ever increasing operating expenses result in negative cash flow, even before projected capital expenditures are taken into account.

In 2008, the operating cash flow of \$207 is not sufficient to fund projected capital expenditures. Without any other financing, this results in a draw down of the cash balance of \$1,530, and a final cash shortfall of \$263. As a result of projected capital expenditures in subsequent periods, the cash shortfall increases over time. By the end of the projection period, the projected cash balance is (negative) \$34,927. This is shown at Line 12 in 2017. A negative cash balance is clearly not sustainable or achievable, and the utility immediately recognizes a need to examine additional funding sources.

**Table 4-2: Statement of cash flow (direct method) – Existing Rates (Example 1)**

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
<b>Operating transactions</b>											
Cash received from:											
1	Revenues	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000
Cash paid for:											
2	Operating Costs	(3,750)	(3,825)	(3,902)	(3,980)	(4,059)	(4,140)	(4,223)	(4,308)	(4,394)	(4,482)
3	Finance Charges	80	32	(14)	(44)	(85)	(130)	(434)	(475)	(523)	(563)
		(3,671)	(3,793)	(3,916)	(4,023)	(4,144)	(4,270)	(4,657)	(4,783)	(4,917)	(5,044)
4	Cash provided from operating transactions	330	207	84	(23)	(144)	(270)	(657)	(783)	(917)	(1,044)
<b>Capital transactions</b>											
5	Acquisition of tangible capital assets	-	(2,000)	(1,875)	(1,500)	(2,000)	(2,100)	(15,000)	(1,750)	(2,000)	(1,500)
6	Cash applied to capital transactions	-	(2,000)	(1,875)	(1,500)	(2,000)	(2,100)	(15,000)	(1,750)	(2,000)	(1,500)
<b>Finance transactions</b>											
7	Proceeds from debt issues	-	-	-	-	-	-	-	-	-	-
8	Debt repayment	-	-	-	-	-	-	-	-	-	-
9	Cash applied to financing transactions	-	-	-	-	-	-	-	-	-	-
10	Increase/(decrease) in cash and cash equivalents	330	(1,793)	(1,791)	(1,523)	(2,144)	(2,370)	(15,657)	(2,533)	(2,917)	(2,544)
11	Cash and cash equivalents, beginning of period	1,200	1,530	(263)	(2,054)	(3,577)	(5,721)	(8,091)	(23,748)	(26,281)	(29,198)
12	Cash and cash equivalents, end of period	1,530	(263)	(2,054)	(3,577)	(5,721)	(8,091)	(23,748)	(26,281)	(29,198)	(31,742)
13	Cash as percentage of net fixed assets	6.4%	(1.1%)	(8.0%)	(13.7%)	(21.2%)	(29.0%)	(57.3%)	(63.1%)	(69.4%)	(75.6%)

### *Step 2: Analysis of Funding Options*

To address its capital expenditure needs, the utility considers each of the three sources of capital expenditure funding identified above.

#### *Step 2a: Issuing New Debt*

As a first step, the utility assumes that it will fund the large capital expenditure (of \$15,000) in 2013 using debt. As this expenditure is for a new treatment asset that will provide higher service quality and that will meet future growth needs as well as the needs of existing users, the utility believes it to be appropriate to finance this expenditure with debt. This creates a liability that falls on future system users. This option is chosen over the alternative of attempting to pre-fund this large acquisition through increased rates now. The principal portion of new debt is subsequently repaid in equal annual instalments over 20 years. Associated interest payments decline over time with the decline in the outstanding debt balance. The interest rate is assumed to be six per cent.

**Table 4-3: Statement of cash flow (direct method) – Existing Rates and New Debt (Step 2a)**

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
<b>Operating transactions</b>											
Cash received from:											
1 Revenues	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000
Cash paid for:											
2 Operating Costs	(3,750)	(3,825)	(3,902)	(3,980)	(4,059)	(4,140)	(4,223)	(4,308)	(4,394)	(4,482)	(4,571)
3 Finance Charges	80	32	(14)	(44)	(85)	(130)	(434)	(1,390)	(1,408)	(1,418)	(1,439)
	(3,671)	(3,793)	(3,916)	(4,023)	(4,144)	(4,270)	(4,657)	(5,698)	(5,802)	(5,899)	(6,010)
Cash provided from											
4 operating transactions	330	207	84	(23)	(144)	(270)	(657)	(1,698)	(1,802)	(1,899)	(2,010)
<b>Capital transactions</b>											
Acquisition of tangible											
5 capital assets	-	(2,000)	(1,875)	(1,500)	(2,000)	(2,100)	(15,000)	(1,750)	(2,000)	(1,500)	(2,000)
Cash applied to capital											
6 transactions	-	(2,000)	(1,875)	(1,500)	(2,000)	(2,100)	(15,000)	(1,750)	(2,000)	(1,500)	(2,000)
<b>Finance transactions</b>											
7 Proceeds from debt issues	-	-	-	-	-	-	15,000	-	-	-	-
8 Debt repayment	-	-	-	-	-	-	-	(750)	(750)	(750)	(750)
Cash applied to financing											
9 transactions	-	-	-	-	-	-	15,000	(750)	(750)	(750)	(750)
Increase/(decrease) in cash											
10 and cash equivalents	330	(1,793)	(1,791)	(1,523)	(2,144)	(2,370)	(657)	(4,198)	(4,552)	(4,149)	(4,760)
Cash and cash equivalents,											
11 beginning of period	1,200	1,530	(263)	(2,054)	(3,577)	(5,721)	(8,091)	(8,748)	(12,946)	(17,498)	(21,647)
Cash and cash equivalents,											
12 end of period	1,530	(263)	(2,054)	(3,577)	(5,721)	(8,091)	(8,748)	(12,946)	(17,498)	(21,647)	(26,407)
Cash as percentage of net											
13 fixed assets	6.4%	(1.1%)	(8.0%)	(13.7%)	(21.2%)	(29.0%)	(21.1%)	(31.1%)	(41.6%)	(51.6%)	(62.3%)

The results of taking on debt are depicted in Table 4-3. Compared to the first scenario, operating cash flow from years 2014 onward is reduced by the increased debt-service requirements from the addition of new debt in 2013. This illustrates the fact that debt financing only defers the need to increase rates, and does not eliminate the impact on users of the addition of new assets.

The addition of \$15,000 in debt in 2013 results in a ratio of debt to total fixed assets of 36.2 per cent (although this ratio then falls over time as new assets are added). The utility is not comfortable with taking on additional debt financing beyond the initial \$15,000 in 2013, even though the ratio of debt to fixed assets of 36.2 per cent is well under this Guideline's suggested maximum of 50 per cent of total fixed assets (see Chapter VI). Consequently the utility recognizes that it will be necessary to consider the additional option of increasing rates.

*Step 2b: Raising Rates and Issuing New Debt*

The utility can increase rates to eliminate the cash shortfalls, while fully covering capital and operating expenditures. This step builds on Step 1 where debt is used to finance capital expenditures planned for 2013 only.

Raising utility rates in this example is an iterative process and utility preferences about rate increases influence how steeply and over what period the rate rises occur. This example allows for rates to increase steadily over a three-year period and then remain constant for the remaining seven-year projection horizon, as shown in Table 4-4. This is only one possible option; numerous other variations could be used depending on the utility's circumstances and preferences.

**Table 4-4: Planned utility rates over a 10-year period**

Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Rate (Unit) \$	100	125	150	175	175	175	175	175	175	175	175

Suppose starting year rates equal \$100 per unit. The utility provides 40 units of service, yielding total revenues of \$4,000 in 2007. Rates are increased to \$175 per unit by year 2010. This is a substantial increase, and includes a 25 per cent rate increase (to \$125) in the first year (2008). Beyond 2010, rates stay at the \$175 level over the remainder of the projection horizon.

Table 4-5 provides the same cash flow statement given all of these parameters. Tables 4-6, 4-7 and 4-8, meanwhile, provide a number of additional simplified schedules, including a Statement of Financial Position, a Statement of Operations, and a Statement of Changes in Net Financial Assets. These statements have been included to provide the reader with further information on

the asset and liability position of the utility and accounting profit/loss information over the projection horizon. Note that most of the information required by the Financial Plans Regulation is included in these sample statements. The exceptions are in some categories pertaining to the financial position of the utility, which have been excluded to maintain the example's simplicity .

Note the increases in rates from years 2008 to 2010 increase operating cash flow, and thus help to fund capital expenditure in those years. Cash balances remain positive, which is a key goal of the funding process. Also note the injection of debt in 2013 covers the major expenditure of \$15,000 and allows the application of all operating cash flow in that year to increase cash reserves. Cash reserves thus reach a maximum level of \$7,346 at the end of 2013.

Moving beyond 2013, cash reserves begin a sustained fall because operating cash flow does not fully cover projected capital expenditures. Cash provided from operating transactions (line four) varies between \$1,662 and \$1,530, while capital expenditures are at least \$1,500 annually. Nevertheless, due to the fact cash reserves have been built up in prior years due to the rate increase, cash reserves are still positive at \$3,487 at the end of the projection period. This is substantially above the starting level of \$1,200. The utility believes that this cash position provides a good financial cushion to weather unexpected future developments.

As a refinement, the utility may wish to consider additional rate increases in line with inflation after 2010. This will maintain rates at a constant real, or inflation-adjusted level. It will also help reduce the reduction in cash reserves that occurs following the year 2013.

**Table 4-5: Statement of cash flow (direct method) – Increased Rates and New Debt (Step 2b)**

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
<b>Operating transactions</b>											
Cash received from:											
1	Revenues	4,000	5,000	6,000	7,000	7,000	7,000	7,000	7,000	7,000	7,000
Cash paid for:											
2	Operating Costs	(3,750)	(3,825)	(3,902)	(3,980)	(4,059)	(4,140)	(4,223)	(4,308)	(4,394)	(4,482)
3	Finance Charges	80	62	69	115	143	166	(134)	(1,030)	(988)	(938)
		(3,671)	(3,763)	(3,833)	(3,865)	(3,916)	(3,975)	(4,357)	(5,338)	(5,382)	(5,419)
4	Cash provided from operating transactions	330	1,237	2,167	3,135	3,084	3,025	2,643	1,662	1,618	1,581
<b>Capital transactions</b>											
5	Acquisition of tangible capital assets	-	(2,000)	(1,875)	(1,500)	(2,000)	(2,100)	(15,000)	(1,750)	(2,000)	(1,500)
6	Cash applied to capital transactions	-	(2,000)	(1,875)	(1,500)	(2,000)	(2,100)	(15,000)	(1,750)	(2,000)	(1,500)
<b>Finance transactions</b>											
7	Proceeds from debt issues	-	-	-	-	-	15,000	-	-	-	-
8	Debt repayment	-	-	-	-	-	-	(750)	(750)	(750)	(750)
9	Cash applied to financing transactions	-	-	-	-	-	15,000	(750)	(750)	(750)	(750)
10	Increase/(decrease) in cash and cash equivalents	330	(763)	292	1,635	1,084	925	2,643	(838)	(1,132)	(669)
11	Cash and cash equivalents, beginning of period	1,200	1,530	767	1,059	2,694	3,778	4,703	7,346	6,508	5,376
12	Cash and cash equivalents, end of period	1,530	767	1,059	2,694	3,778	4,703	7,346	6,508	5,376	4,707
13	Cash as percentage of net fixed assets	6.4%	3.1%	4.1%	10.3%	14.0%	16.8%	17.7%	15.6%	12.8%	11.2%

**Table 4-6: Statement of Financial Position (Step 2b)**

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Financial assets											
Cash	1,530	767	1,059	2,694	3,778	4,703	7,346	6,508	5,376	4,707	3,487
Liabilities											
Debt	-	-	-	-	-	-	15,000	14,250	13,500	12,750	12,000
Net financial assets (debt)	1,530	767	1,059	2,694	3,778	4,703	(7,654)	(7,742)	(8,124)	(8,043)	(8,513)
Non financial assets											
Tangible capital assets	24,000	24,960	25,758	26,150	27,003	27,913	41,424	41,649	42,085	41,990	42,356

**Table 4-7: Statement of Operations (Step 2b)**

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Revenue	4,000	5,000	6,000	7,000	7,000	7,000	7,000	7,000	7,000	7,000	7,000
Expenses											
Operating costs	3,750	3,825	3,902	3,980	4,059	4,140	4,223	4,308	4,394	4,482	4,571
Amortization	1,000	1,040	1,078	1,108	1,148	1,190	1,490	1,525	1,565	1,595	1,635
Interest	(80)	(62)	(69)	(115)	(143)	(166)	134	1,030	988	938	899
Annual surplus/(deficit)	(671)	197	1,090	2,028	1,936	1,836	1,153	138	54	(14)	(105)
Accumulated surplus, beginning of period	26,200	25,530	25,727	26,817	28,844	30,780	32,616	33,770	33,907	33,961	33,947
Accumulated surplus, end of period	25,530	25,727	26,817	28,844	30,780	32,616	33,770	33,907	33,961	33,947	33,842

**Table 4-8: Statement of changes in net financial assets (debt) (Step 2b)**

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Annual surplus/(deficit)	(671)	197	1,090	2,028	1,936	1,836	1,153	138	54	(14)	(105)
Amortization of tangible capital assets	1,000	1,040	1,078	1,108	1,148	1,190	1,490	1,525	1,565	1,595	1,635
Acquisition of tangible capital assets	-	(2,000)	(1,875)	(1,500)	(2,000)	(2,100)	(15,000)	(1,750)	(2,000)	(1,500)	(2,000)
Change in net financial assets (debt)	330	(763)	292	1,635	1,084	925	(12,357)	(88)	(382)	81	(470)
Net financial asset (debt) position, beginning of period	1,200	1,530	767	1,059	2,694	3,778	4,703	7,346	6,508	5,376	4,707
Net financial asset (debt) position, end of period	1,530	767	1,059	2,694	3,778	4,703	(7,654)	7,258	6,126	5,457	4,237

### ***IV.3.1: Updates to the Plan***

In this section, we examine the changes that our hypothetical utility may need to make to its plan when it wants to update the plan in the following year. This section is designed to provide an example of how a utility may roll-forward its plan during an annual update.

Let us assume the update to the plan occurs in the year 2008. In this year, the utility has already begun to increase rates as noted in Step 2b in the section above.

In undertaking the update, we assume that the utility will now have more accurate information on future capital expenditures. Capital expenditures for 2008 are assumed to be fixed, however, and thus no update is shown in Table 4-9. Projections for 2018 are now also shown in the Table, reflecting the roll-forward of capital expenditure projections.

***Table 4-9: New Capital Expenditure required over a 10-year period***

Year	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Capital Expenditure (\$)	1,875	1,500	1,700	2,100	20,000	1,750	2,500	1,500	2,000	3,000

As noted in Table 4-9, the utility's capital expenditure for the water treatment asset has increased from \$15,000 to \$20,000. This is in addition to some minor adjustments made in other years and the introduction of the additional year (2018) capital expenditure of \$3,000.

To help with the funding of the construction of the new water treatment asset, the Provincial Government has pledged to contribute \$3,000. Consequently, the Utility will now need to raise debt of \$17,000 to cover the cost of construction.

Table 4-10 provides the cash flow statement.

Beyond 2013, cash reserves continue to fall because operating cash flow does not fully cover the additional projected capital expenditures. Cash provided from operating transactions (line four) continues to decline between \$1,446 and \$1,265, while capital expenditures are at least \$1,500 annually. Consequently, the cash reserve built up in prior years due to the rate increases is nearly exhausted and in 2018 falls to \$356. This is below the starting level of \$1,200.

As a refinement, the utility may wish to consider additional rate increases in line with inflation after 2010. This will maintain rates at a constant real or inflation-adjusted level. It will also help offset the reduction in cash reserves that occurs following the year 2013.

**Table 4-10: Statement of cash flow (direct method)– Increased Rates , New Debt (Step 2c)**

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
<b>Operating transactions</b>											
Cash received from:											
1 Revenues	5,000	6,000	7,000	7,000	7,000	7,000	7,000	7,000	7,000	7,000	7,000
Provincial government funding	-	-	-	-	-	3,000	-	-	-	-	-
	5,000	6,000	7,000	7,000	7,000	10,000	7,000	7,000	7,000	7,000	7,000
Cash paid for:											
2 Operating Costs	(3,825)	(3,902)	(3,980)	(4,059)	(4,140)	(4,223)	(4,308)	(4,394)	(4,482)	(4,571)	(4,663)
3 Finance Charges	62	69	115	152	175	(228)	(1,246)	(1,210)	(1,156)	(1,113)	(1,072)
	(3,763)	(3,833)	(3,865)	(3,907)	(3,966)	(4,451)	(5,554)	(5,604)	(5,637)	(5,684)	(5,735)
4 Cash provided from operating transactions	1,237	2,167	3,135	3,093	3,034	5,549	1,446	1,396	1,363	1,316	1,265
<b>Capital transactions</b>											
5 Acquisition of tangible capital assets	(2,000)	(1,875)	(1,500)	(1,700)	(2,100)	(20,000)	(1,750)	(2,500)	(1,500)	(2,000)	(2,000)
6 Cash applied to capital transactions	(2,000)	(1,875)	(1,500)	(1,700)	(2,100)	(20,000)	(1,750)	(2,500)	(1,500)	(2,000)	(2,000)
<b>Finance transactions</b>											
7 Proceeds from debt issues	-	-	-	-	-	17,000	-	-	-	-	-
8 Debt repayment	-	-	-	-	-	-	(850)	(850)	(850)	(850)	(850)
9 Cash applied to financing transactions	-	-	-	-	-	17,000	(850)	(850)	(850)	(850)	(850)
10 Increase/(decrease) in cash and cash equivalents	(763)	292	1,635	1,393	934	2,549	(1,154)	(1,954)	(987)	(1,534)	(1,585)
11 Cash and cash equivalents, beginning of period	1,530	767	1,059	2,694	4,087	5,021	7,570	6,416	4,462	3,475	1,941
12 Cash and cash equivalents, end of period	767	1,059	2,694	4,087	5,021	7,570	6,416	4,462	3,475	1,941	356
13 Cash as percentage of net fixed assets	3.1%	4.1%	10.3%	15.3%	18.2%	16.4%	13.9%	9.5%	7.4%	4.1%	0.8%
14 Debt as percentage of net fixed assets	0.0%	0.0%	0.0%	0.0%	0.0%	36.9%	35.0%	32.6%	30.9%	28.9%	27.0%

***IV.3.2: Consideration of Construction Phasing***

Alternatively, during its review and updating of the plan, a utility may determine that some of its large capital expenditures may occur over a four-to-five-year timeline rather than in a single year. This will have the effect of deferring some of the associated expenditures and also delaying the need for capital funding.

For the purposes of this example, it is assumed that the construction of a new water treatment plant will now be carried out over a five-year period, with estimated spending of \$4,000 per year beginning in 2013. This schedule replaces the large \$20,000 expenditure previously shown in 2013. This is noted in Table 4-11. Any changes to the rate of construction and estimated expenditures in a given year would be updated during the annual review process.

These capital expenditures will be included in the utility's tangible capital assets as Construction In Progress (CIP) with no amortization taken until the asset is available for use. If we assume the asset will be completed at the end of 2016, then amortization will begin in 2017 and will form part of operating costs in 2017.

***Table 4-11: New Capital Expenditure required over a 10-year period***

Year	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Previous Capital Expenditure (Table 4-9)(\$)	1,875	1,500	1,700	2,100	20,000	1,750	2,500	1,500	2,000	3,000
Revised Capital Expenditure (\$)	1,875	1,500	1,700	2,100	4,000	5,750	6,500	5,500	6,000	3,000

Since the asset will not be completed until 2017, it is anticipated that debt financing will not occur until the project's mid-point, with debt issued in 2015. It is assumed that the timing of the receipt of the government funding is not expected to change. Table 4-12 provides the resulting cash flow statement.

**Table 4-12: Statement of cash flow (direct method)– Increased Rates , New Debt (Step 2c)**

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
<b>Operating transactions</b>											
Cash received from:											
1 Revenues	5,000	6,000	7,000	7,000	7,000	7,000	7,000	7,000	7,000	7,000	7,000
Provincial government funding	-	-	-	-	-	3,000	-	-	-	-	-
	5,000	6,000	7,000	7,000	7,000	10,000	7,000	7,000	7,000	7,000	7,000
Cash paid for:											
2 Operating Costs	(3,825)	(3,902)	(3,980)	(4,059)	(4,140)	(4,223)	(4,308)	(4,394)	(4,482)	(4,571)	(4,663)
3 Finance Charges	62	69	115	152	175	138	46	(47)	(1,144)	(1,181)	(1,160)
	(3,763)	(3,833)	(3,865)	(3,907)	(3,966)	(4,085)	(4,261)	(4,441)	(5,625)	(5,752)	(5,823)
4 Cash provided from operating transactions	1,237	2,167	3,135	3,093	3,034	5,915	2,739	2,559	1,375	1,248	1,177
<b>Capital transactions</b>											
5 Acquisition of tangible capital assets	(2,000)	(1,875)	(1,500)	(1,700)	(2,100)	(4,000)	(5,750)	(6,500)	(5,500)	(6,000)	(3,000)
6 Cash applied to capital transactions	(2,000)	(1,875)	(1,500)	(1,700)	(2,100)	(4,000)	(5,750)	(6,500)	(5,500)	(6,000)	(3,000)
<b>Finance transactions</b>											
7 Proceeds from debt issues	-	-	-	-	-	-	-	17,000	-	-	-
8 Debt repayment	-	-	-	-	-	-	-	-	(850)	(850)	(850)
9 Cash applied to financing transactions	-	-	-	-	-	-	-	17,000	(850)	(850)	(850)
10 Increase/(decrease) in cash and cash equivalents	(763)	292	1,635	1,393	934	1,915	(3,011)	13,059	(4,975)	(5,602)	(2,673)
11 Cash and cash equivalents, beginning of period	1,530	767	1,059	2,694	4,087	5,021	6,936	3,925	16,984	12,008	6,406
12 Cash and cash equivalents, end of period	767	1,059	2,694	4,087	5,021	6,936	3,925	16,984	12,008	6,406	3,733
13 Cash as percentage of net fixed assets	3.1%	4.1%	10.3%	15.3%	18.2%	22.8%	11.3%	42.8%	27.5%	13.4%	7.6%
14 Debt as percentage of net fixed assets	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	42.8%	37.0%	32.0%	29.4%

### ***IV.3.3: Treatment of Contributed Assets***

A utility may receive contributed assets for which it does not have a cash outlay, for instance from a developer. For accounting purposes these assets are added to tangible capital assets and amortized over the appropriate useful life. The off-setting entry would be to record this revenue as developer contributions in the year that the assets are received. Both the revenue and the acquisition of the asset are non-cash items and thus would not be reflected in the statement of cash flow. The asset would be included in the statement of financial position and the revenue and amortization expense would be included in the statement of operations.

## Chapter V: Revenue Sources and Rate Structures

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This Chapter discusses the various sources of revenue that utilities can access to generate additional funds for the utility. This Chapter thus addresses Step 5 of the proposed Five Step approach to preparing a Financial Plan.

A large number of revenue sources are available to utilities for the provision of water and wastewater services. Many of these revenue types can be structured and collected in different ways. The topics of revenue sources and rate structures are too broad for a comprehensive treatment in this Guideline. This Chapter, however, provides a brief introduction:

### V.1 Rate Structure Objectives

There are a number of best practices dealing with the raising of revenue from local sources. These include:

1. Rate structures should promote financial sustainability and water conservation.
2. Metering and the use of rates are preferable to cross subsidization using property taxes.

Rate structure design is an important consideration in the gradual transition to financial sustainability. In addition to financial sustainability, rate structures can be designed to address other policy objectives, such as providing an equitable distribution of costs, protecting low-income users, and promoting water conservation. Therefore, it is recommended that utilities carefully consider the role of rate structures in achieving objectives related to providing financially sustainable water and wastewater services.

***Principle #7:***

*Ensuring users pay for the services they are provided leads to equitable outcomes and can improve conservation. In general, metering and the use of rates can help ensure users pay for services received.*

### **Case Study:**

*Over the summer of 2005, Trent Hills completed the metering of all residential and institutional, commercial, and industrial (ICI) water customers in its three communities of Campbellford, Hastings, and Warkworth. Subsequently, the utility has implemented user-pay pricing that promotes equity and encourages water conservation. In 2006, the municipality moved to a single volumetric rate supplemented by fixed service charges to cover billing and fire protection service costs. The municipality anticipates no cross-subsidization of service over its current 10 year planning horizon.*

*"The adoption of universal metering has greatly expanded the number of rate structures possible in our municipality. Our move to a uniform block rate will promote sustainability over time while encouraging conservation."*

*- Mike Rutter*

*Administrator, Municipality of Trent Hills*

### **Further Reading:**

<http://www.trenthills.ca/water.html>

## **V.2 Revenue Sources**

The following revenue sources are typically used by municipalities to fund water and wastewater services:

1. Water and sewer rates: Municipalities may impose charges for water and wastewater service provided directly to property owners. A variety of tariff structures are possible, including volumetric and flat-rate charges.
2. Capital specific funds: These sources of funds include development charges, heavy loading charges, sewer and water area charges, improvement charges and connection fees.
3. Government grants: From time to time, or on an ongoing basis, the provincial and federal governments provide grants to water and wastewater utilities.
4. Property taxes: Municipalities may fund a proportion of the costs of water and wastewater services out of property tax revenues.

## **V.3 The Role of Property Taxes**

Property taxes can play a role in funding the costs of water and wastewater services. For example, it is quite appropriate to use property taxes to fund those water service costs associated with providing fire-protection services. Costs can

include both the costs of additional treatment and distribution capacity to meet peak firefighting demands and the costs of water actually used to fight fires. The use of property taxes is also appropriate for those wastewater collection and treatment costs associated with handling storm-water flows. Costs for fire protection services and for storm-water handling are not related to consumers' water consumption and thus would not necessarily be included in water rates under a user-pay approach. Issues related to fire protection costs and storm water service are discussed in more detail in Section 4 of Chapter II.

#### **V.4 Capital Specific Funds**

A range of funding sources are available in Ontario that are statutorily tied to capital costs, with some specifically for water and wastewater service provision. These sources of funds include development charges, heavy loading charges, sewer and water area charges, improvement charges and connection fees. Other sources of capital funds include grants from senior governments, and contributions in kind.

The *Development Charges Act, 1997* (DCA) governs what municipalities can levy as development charges. Development charges are set out in municipal by-laws and are charges levied on developers and builders to pay for growth related capital costs, such as roads, sewers and transit. They are used to fund capital costs to establish infrastructure needed to serve new growth (both residential and non-residential). Development charges do not pay for operating costs or the future repair and rehabilitation of infrastructure.

The DCA is designed to ensure that a municipality's existing taxpayers are not required to pay the cost of new services and facilities required to serve new developments. It ensures that growth pays for itself. The DCA allows municipalities to levy development charges for most of the services they provide. However, not all services are 100 per cent recoverable, and some services are excluded from the DCA. Excluded services include hospitals, administrative buildings, land for parks, tourism facilities and waste-management services.

Services not 100 per cent recoverable or not excluded under the DCA may still be eligible for a development charge, subject to a 10 per cent discount.

In a development charges by-law, the municipality must set out rules for determining where the by-law applies within the municipality, the rules for the application of charges to redevelopment and, if a charge is payable in any particular case, the amount charged. It also must include a statement indicating how, if at all, the rules provide for exemptions from, phasing-in and/or indexing of development charges. A local municipal council has the authority to pass by-laws and make decisions dealing with the development charges by-law.

Other sources of capital funds include movements in and out of reserve funds. These reserve-fund flows represent a means of shifting revenues across time rather than as sources of new revenue in their own right. Transfers out of such reserve funds can be either discretionary or, in the case of development charge funds, obligatory, according to the use to which the funds can be put. Sources arising from reserve funds can include: transfers from operating budgets, transfers from development charge funds, transfers from asset replacement reserves, transfers from reserves for future acquisitions, and transfers from contingency reserves.

## **V.5 Sources of Capital Financing**

There are a number of capital financing sources available. These sources consist of direct or indirect reliance on capital markets to secure cash for the acquisition of a capital asset in exchange for a series of debt service payments over time. Sources of capital financing include Infrastructure Ontario's OSIFA (Ontario Strategic Infrastructure Financing Authority) loan program, issuance of debt, and leases of capital assets.

## **Chapter VI: Feedback and Continuous Improvement**

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Financial Plans are living documents that should be updated and reviewed as new information becomes available and as a utility's financial picture changes from year to year. The Financial Plans Regulation requires that Financial Plans be prepared together with an application or renewal of a Municipal Drinking-Water Licence (every five years). In addition, and as a best practice, this Guideline suggests that Financial Plans be updated on an annual forward-looking basis. By doing so, continuous improvement will be fostered across the sector and results can be considered as part of the annual municipal budget process.

### **VI.1 Review and Renewal of Financial Plans**

This section provides a series of tools and guidance on reviewing and renewing Financial Plans. It includes a review of past projections, the preparation of business cases for significant new infrastructure projects, and potential indicators of Funding Plan reasonableness.

#### ***VI.1.1 Periodic Review of Past Projections***

From time to time, a good practice is to review the accuracy of projections in both Capital Investment and Funding Plans. The appropriate frequency for such reviews is likely to be once every three to five years. Under the Financial Plans Regulation, licence holders must update their Financial Plan prior to applying for a licence renewal. Such reviews are useful in at least two respects:

1. They can help ensure that a utility's approach to financial projections provides a realistic view of future financial needs, including the level of capital expenditures and cash flow from operations.
2. They can highlight areas where further analysis and investigation is warranted.

One key element of such a review is to analyze differences between actual and expected capital expenditures. Differences can reflect a range of circumstances, and each of these circumstances can have different implications for how a utility might adjust its planning approach, and therefore the future plans themselves. Factors that may contribute to changes in actual versus planned capital spending can include the following:

1. Lower or higher-than-expected unit costs for replacement of a given quantity of assets.
2. Differences in the life expectancy of assets, relative to initial assumptions.

3. Differences in the rate at which the utility replaces assets, compared to the forecast.

Understanding the reasons for these differences can help the municipality to:

1. Update and refine assumptions on asset replacement costs.
2. Update and refine assumptions on asset lives.
3. Ensure that a utility's infrastructure deficit is not increasing.

Reviews can also focus on a variety of other parameters in addition to actual capital expenditures. For each year within the review period, the review can examine variances between actual and projected results for the following data values:

1. Water and sewer charges
2. Operating expenses
3. Administration charges, especially when paired with charges to the municipality
4. Interest expenses
5. Amortization expenses
6. Capital expenditures.

At the end of the review period, it is possible for utilities to identify similar variances between actual and projected values for the following:

1. Gross book value of tangible capital assets
2. Accumulated amortization of tangible capital assets
3. Water (or wastewater) accumulated surplus/deficit including any amount allocated to reserve funds
4. Long-term debt
5. Other liabilities.

## ***VI.1.2 Business Case as a Good Practice***

### ***Principle #8:***

*Financial Plans are “living” documents that require continuous improvement. Comparing the accuracy of financial projections with actual results can lead to improved planning in the future.*

Consistent with the principle that a Financial Plan is a living document, utilities may wish to consider preparing business cases for significant projects. Many utilities already prepare business cases for municipal councils and decision-makers to provide a full picture of both the financial impact of the project upon their capital budgets and the positioning of each project within the broader municipal setting (e.g. taking into account social, economic, and environmental issues).

While business cases can be in different formats, they should contain key common elements such as project rationale, expected benefits, proposed sources of financing, expenses, and a risk assessment. The business case could also include project details necessary to comply with Ministry of the Environment legislative requirements including source protection costs or implementation of the Drinking-Water Quality Management Standard.

In preparing business cases for decision makers, utility staff may wish to consider any existing economic or financial impact analyses already completed, such as those conducted for the purposes of an environmental assessment. The Ontario *Environmental Assessment Act, 1990*, defines environment broadly to include: the natural, social, economic, cultural and built environments, and the inter-relationships between the various components of the environment. Therefore it is expected that in an environmental assessment, proponents include a discussion and evaluation of the potential negative or positive effects of the proposed undertaking and its alternatives to the economic/financial environment.

With future investment needs in mind, this Guideline suggests that when undertaking new projects, utilities should give serious consideration to ensuring full cost recovery of all project costs from the existing or potential users of the system. This will go a long way to ensuring the future financial sustainability of the overall system.

As a resource in planning projects, municipalities may wish to consider *An Infrastructure Planning, Financing and Procurement Framework for Ontario's Public Sector*, published in July 2004 by Public Infrastructure Renewal. This comprehensive framework is aimed at guiding the Ontario government,

municipalities, and broader public sector partners in choosing the best options for planning, financing and procuring public infrastructure assets. It provides useful advice in areas such as:

1. Planning, designing, financing and managing public infrastructure investments.
2. Developing innovative and creative ways to meet Ontario's infrastructure needs while protecting and promoting the public interest.
3. Facilitating the development and sharing best practices in infrastructure planning, financing and procurement across the public sector.
4. Encouraging capital investment planning that takes into account the ongoing operating costs associated with capital investments in order to ensure efficient delivery of public services, increased accessibility for persons with disabilities, reduced public sector operating expenses and energy conservation.
5. Business case development, selecting an appropriate financing and procurement model and asset management strategies to maximize the useful life of public infrastructure assets.

The framework can be found at:

[http://www.pir.gov.on.ca/english/aboutpir/publications/BBT-Framework\\_EN.pdf](http://www.pir.gov.on.ca/english/aboutpir/publications/BBT-Framework_EN.pdf)

### ***VI.1.3 Indicators of Funding Plan Reasonableness***

There are a number of specific indicators that can be used to evaluate the reasonableness of Funding Plans at a high level:

1. Ratio: Debt to Net Fixed Assets. It is straightforward for plans to show the ratio of external debt to net fixed assets. A good practice is to review increases in this ratio, as rapid increases may be a sign of problems. As a benchmark for a utility, it is recommended that debt not exceed 50 to 60 per cent of net fixed assets, on an overall system basis. Note that this recommended constraint is not related to any other debt limits imposed on municipalities by provincial legislation.
2. Debt Service Coverage Ratios. Inclusion of these ratios in Funding Plans would show that typical solvency and credit quality checks will be met. In particular, it is recommended that utilities have sufficient cash-flow to cover debt service payments should adverse changes in sales volumes or operating cost increases occur.

Within the periodic review and renewal of their Financial Plans, utilities should undertake to review and explore all managerial, operational and technological options for enhancing the financial and environmental performance of their water and wastewater services. For example, utilities may wish to consider improving the capabilities of their Information and Information Technology (I&IT) systems and of their Geographic Information Systems. Within Ontario, there are many best practice examples of how to finance and operate water and wastewater systems, aspects of which may be reviewed and incorporated on an ongoing basis.

## **VI.2 Organizing and Operating Water and Wastewater Systems**

How water and wastewater systems are organized, governed and operated is relevant to financial sustainability and should be briefly mentioned as part of this Guideline. This section is meant to support municipal reviews of drinking-water and wastewater systems, and does not constitute provincial endorsement of any particular model.

### ***VI.2.1 Organizational and Governance Models***

Many different management and operating models are available for municipal consideration, and this section briefly reviews the available alternatives.

Currently, most water and wastewater services in Ontario are provided through municipal departments, with oversight provided directly by municipal councils. Typically, lower-tier municipalities govern their own systems. In some cases, however, governance is split between lower and upper tiers. In addition, there are models for area water systems in Ontario, in which systems cross municipal boundaries. These systems are governed by boards representing their municipal owners.

Municipalities may also create Municipal Service Boards, whose members would be appointed by council (and which could include either council members or private citizens, or both). Service boards have independent boards and their finances may be partially separated from those of the municipality. As with municipal departments, Municipal Service Boards are tied into the municipal budgeting process.

As discussed earlier, municipalities can now create municipally owned corporate water utilities. This is similar to the manner in which other utilities, such as those for natural gas and electricity distribution, are organized and governed in Ontario. A municipal corporation is a legally separate corporate entity from the municipality (or group of municipalities) that owns it. It is governed by a board of directors that is appointed by the shareholder(s) – the municipality (or group

of municipalities) – and typically receives high-level direction from its shareholder(s). Municipal water corporations must be 100 per cent publicly-owned and controlled.

Municipalities that wish to keep water and wastewater finances and borrowing decisions separate and apart from those of the municipality may choose the corporate utility model. Municipalities may also create corporate utilities if they are involved (or considering) area water and wastewater systems.

### ***VI.2.2 Operation of Water and Wastewater Facilities***

While most utilities are currently operated by municipal staff, municipalities have a variety of options for operating their water and wastewater facilities. These options are outlined below.

#### *VI.2.2.1 The Ontario Clean Water Agency (OCWA)*

Municipalities can outsource the operation of their water or wastewater system to OCWA. OCWA is a provincial Crown corporation established under the *Capital Investment Plan Act, 1993*. One of its primary purposes is to operate water and sewage works under contract with their municipal or private sector owners.

OCWA offers its services across the entire province, including to small and remote municipalities that may otherwise have limited options when it comes to operating their own systems, or commissioning other service providers to do it for them.

#### *VI.2.2.2 Another Municipality*

A municipality can enter into an agreement with another municipality to operate its water system. This differs from other types of inter-municipal agreements that provide for joint ownership. For some municipalities it may be a reasonable option to transfer direct operating control to another municipality that has more expertise in running water systems.

#### *VI.2.2.3 Private Operating Agency*

A municipality can contract with a private-sector operator. There are a number of private operators in Ontario that currently operate municipal drinking-water systems.

## VI.3 Roles and Responsibilities

### ***Principle #9:***

*Financial plans benefit from the close collaboration of various groups, including engineers, accountants, auditors, utility staff, and municipal council.*

In conclusion, it is worth restating the principle of integrated planning and the concept that financial planning is a partnership among various municipal parties:

1. Municipal staff (including management, accountants, and engineers);
2. Other service providers (e.g. auditors and consulting engineers); and,
3. Municipal Council.

Below is a brief discussion of the roles and responsibilities these parties would typically play. This discussion assumes that the water utility is a department of the municipality. Where a water utility is organized or operated differently, the allocation of responsibilities will change accordingly.

### ***VI.3.1 Municipal Staff***

Municipal staff may be in the best position to take the lead in preparing Financial Plans as outlined in this Guideline. Municipal staff have the knowledge and understanding necessary to prepare appropriate projections. Within the municipality, utility managers should take overall responsibility for preparation of Financial Plans, and should co-ordinate the contributions of various functional and department staff and accountants, engineers and planners, as well as external consultants as appropriate.

Under the approach outlined earlier, capital expenditure projections should, as a starting point, assume that assets will be replaced when they reach zero net book value. Municipal accountants or finance staff will likely be in the best position to identify those assets that will reach a net book value of zero over the projection horizon. Municipal accountants should also be able to provide the gross book value of assets, assuming that Tangible Capital Asset accounting has been implemented.

Further development of capital expenditure projections, however, is likely to rely significantly on municipal engineering staff:

1. Municipal engineers may wish to take primary responsibility for estimating the replacement costs of those assets that are assumed to be replaced. They

have the most direct knowledge of the factors that will influence such costs and of recent utility experience.

2. Municipal engineers are in the best position to identify those expenditures that are needed to enhance service quality. (This covers the second category of capital expenditures noted above.) This will include upgrades to water or wastewater treatment processes or upgrades to metering equipment to provide better measurement of customer consumption. Engineers can evaluate required upgrades in the context of applicable standards for drinking water or effluent quality.
3. Municipal engineers may wish to take the lead in identifying expenditures to meet utility growth. This can include expansions to treatment facilities to address increased water or wastewater volumes, and the costs associated with new customer connections. The costs of connections can include both new individual customer connections on existing mains and expansions of the distribution system to serve new subdivisions and industrial parks. Connection costs will depend on soil conditions, the design of new infrastructure and distances from the existing pipe network.

Municipal engineering staff should create a database that tracks the unit costs of recent main replacements and new customer connections. This can provide a base of historical data that can be used in identifying future capital costs. These data may be more useful than standard cost curves provided from other sources, since they reflect local business and topographical conditions. Engineering staff are likely to know the key factors that will influence the costs of capital projects, since they have the best understanding of the key technical parameters.

Municipal planning staff may be able to assist in forecasting the number of new customers and their location. New connections are largely driven by new construction and housing starts, and will thus be closely linked to local land use policies and rates of population and employment growth. The location of new customers may influence the costs of connection.

Utility managers and municipal finance staff should take joint responsibility for preparation of the Funding Plan. As outlined earlier in this document, the Funding Plan specifies how projected capital expenditures will be financed. Based on their past experience with issuing debt, municipal finance staff will have the best knowledge of the likely parameters for new debt financing, including term, amortization provisions, and interest rate. Finance staff may also have expertise in preparing financial projections.

Management and finance staff may wish to jointly make decisions about appropriate levels of cash reserves and debt. Required rate increases will flow from decisions on debt financing and the use of reserves.

### ***VI.3.2 Auditors***

Auditors can have a central role in ensuring that the Capital Investment Plans and Funding Plans are reliable. It is expected that these plans will contain a combination of historic and forward-looking information and financial and non-financial information. Auditors have limited ability to provide assurance on forward-looking and non-financial information. However they can provide assurance about the historic information included in the plans. They can also have a role in determining the reliability of the forward-looking information and its consistency with the non-financial information.

Municipal staff have the lead role in the development and preparation of the projections and estimates used in the Capital Investment and the Funding Plans. Auditors can check that these plans are consistent with the assumptions and the estimation methodologies chosen by municipal staff.

The Capital Investment Plan projects the future capital expenditures that will be required to maintain the health and integrity of the system, accommodate growth, and meet new environmental standards.

In order to maintain the health and integrity of the system, the plan must include the replacement of those assets that have reached a net book value of zero, and thus reached the end of their estimated useful life. Through a review of plant records and the utility's asset management system, the auditor could identify those assets that will have a net book value of zero in any given year and ensure that the Capital Investment Plan includes their replacement in the appropriate year.

Assets necessary to accommodate growth and new environmental standards will be identified in the non-financial information associated with the Capital Investment Plan. Auditors can ensure that those identified assets have been included in the Capital Investment Plan calculations in the years involved.

A replacement cost estimation approach will be determined in the development of the Capital Investment Plan. Auditors can ensure that the plan has used the identified estimation approach and that it has been calculated properly.

The Funding Plans will identify the funding of the utility costs over time. These costs include amortization of the base year tangible capital assets as well as the projected capital expenditures proposed under the Capital Investment Plan. The audited financial statements provide a solid foundation for to ensure the completeness of this asset starting point. Auditors can ensure that this starting point agrees with the audited financial statements. The auditor can verify that the amortization rates and methods are consistent with the audited financial statements and with the assumptions used in developing the Funding Plan. The

auditor can also review the categorization of projected asset additions to the various asset categories to see if this is reasonable. Categorization is important because it ultimately determines the applied amortization.

The Funding Plan should identify funding sources for major capital expenditures. Auditors can verify that funding sources have been identified for all of the projected capital expenditures included in the Capital Investment Plan.

A variety of assumptions will be necessary to develop the Funding Plan. These can be verified for accuracy of calculation and consistency with the stated assumptions. For example, if debt financing is contemplated, then the auditor could ensure that the term, amortization period and interest rates used in determining financing costs in the Funding Plan are calculated accurately and consistent with the assumptions described.

### ***VI.3.3 Municipal Council***

Municipal Councils have ultimate responsibility for approving the Financial Plans that are prepared for a water utility. Council must therefore approve the allocation of staff and any other resources that are necessary to prepare an appropriate plan. They have an important role in supporting the preparation of accurate and unbiased plans, so that future investment needs are not understated.

As discussed in Part I, Council and staff should engage the public in decision making processes. Providing accessible reports, plans and broad assessments of performance can support the transition to financial sustainability and foster public confidence in the water and wastewater system.

Some municipalities in Ontario may produce several documents that contain pieces of financial planning and business case information to comply with provincial legislation or in keeping with local business practices. It is important that such documents are available and accessible to the public, and that all relevant aspects of a particular project be considered as a whole at some point in the decision making process.

## **Appendix A: Public Consultation**

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In winter 2007, a working group composed of interested stakeholders from the water sector and the municipal/financial sector was established to provide feedback on the development of this Guideline and the Financial Plans Regulation.

The working group was composed of members/representatives of:

1. Association of Municipal Managers, Clerks and Treasurers of Ontario (AMCTO)
2. Association of Municipalities of Ontario (AMO)
3. City of Toronto
4. Municipal Engineers Association (MEA)
5. Municipal Finance Officers' Association (MFOA)
6. Ontario Municipal Administrators' Association (OMAA)
7. Ontario Municipal Benchmarking Project (OMBI)
8. Ontario Municipal Water Association (OMWA)
9. Ontario Public Works Association (OPWA)
10. Ontario Sewer and Watermain Construction Association (OSWCA)
11. Ontario Water Works Association (OWWA)
12. Pollution Probe
13. Public Sector Accounting staff of the Canadian Institute of Chartered Accountants
14. Regional Public Works Commissioners of Ontario (RPWCO)
15. Sierra Legal Defence Fund
16. Ministry of the Environment (MOE)
17. Ministry of Municipal Affairs and Housing (MMAH)
18. Ministry of Public Infrastructure Renewal (MPIR)

MOE wishes to thank all of these stakeholders for their participation and the valuable input provided over this period.

Note that the views expressed in this Guideline are those of the Ministry of the Environment, and not necessarily those of the individual members or organisations of the working group.

## Appendix B: Glossary<sup>15</sup>

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The objective of PS 3150 Tangible Capital Assets (TCA) is to prescribe the accounting treatment for tangible capital assets of all levels of local government so that users of their summary financial statements can learn about a local government's investments in its tangible capital assets and the changes in those investments over time. The principal issues in accounting for tangible capital assets are the recognition of the assets, the determination of their carrying amounts and the recognition of any amortization charges and impairment losses. This section provides explanations and background information to promote understanding of the standards involved in TCA accounting. (p.14)

**Amortization** is the accounting process of allocating the cost less the residual value of a tangible capital asset to operating periods as an expense over its useful life in a rational and systematic manner appropriate to its nature and use. Amortization expense is an important part of the cost associated with providing local government services, regardless of how the acquisition of tangible capital assets is funded. Depreciation accounting is another commonly used term to describe the amortization of tangible capital assets. (p.99) PS 3150 requires that:

The amortization method and estimate of the useful life of the remaining unamortized portion of a tangible capital asset should be reviewed on a regular basis and revised when the appropriateness of a change can be clearly demonstrated. (PS 3150.29) (p. 22)

**Assets** are economic resources controlled by a local government as a result of past transactions or events and from which future economic benefits may be obtained. Assets have three essential characteristics:

- a) they embody a future benefit that involves a capacity, singly or in combination with other assets, to provide future net cash flows, or to provide goods and services;
- b) the local government can control access to the benefit; and
- c) the transaction or event giving rise to the local government's control of the benefit has already occurred. (p.99)

**Betterment** is a cost incurred to enhance the service potential of a tangible capital asset. The cost of an asset will also include subsequent expenditures for "betterments." (p.20)

**Componentization** - Tangible capital assets may be accounted for using either the single asset or component approach. Whether the component approach is to

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<sup>15</sup> Descriptions taken directly from CICA Guide to Accounting for and Reporting Tangible Capital Assets (April 2007)

be used will be determined by the usefulness of the information versus the cost of collecting and maintaining information at the component level.

Factors to consider when determining whether to use a component approach include:

- a) Major components have significantly different useful lives and consumption patterns than the related tangible capital asset.
- b) Value of components in relation to the related tangible capital asset.

Civil infrastructure systems should use the component approach. Major components should be grouped when the assets have similar characteristics and estimated useful lives or consumption rates. (pp.97 - 98)

**Contributions** of tangible capital assets may be received by local governments. For example, tangible capital assets may be transferred from senior levels of government at no or nominal cost. Frequently, development agreements require developers to provide tangible capital assets such as roads, sidewalks and street lighting. The difficulty with donated or contributed assets is determining the appropriate value at which to record them. PS 3150 states that the cost of a donated or contributed asset is considered equal to its fair value at the date of contribution. Fair value is the amount of the consideration that would be agreed on in an arm's length transaction between knowledgeable, willing parties who are under no compulsion to act. Given the nature of some tangible capital assets, there may not be an active market for them. PS 3150 states that fair value of a contributed tangible capital asset may be estimated using market or appraisal values. In some circumstances, cost may be determined by an estimate of replacement cost. In unusual circumstances, where it is impossible to estimate its fair value, the tangible capital asset would be recognized at nominal value. (pp.19 - 20)

**Cost** is the gross amount of consideration given up to acquire, construct, develop or better a tangible capital asset, and includes all costs directly attributable to the asset's acquisition, construction, development or betterment, including installing the asset at the location and in the condition necessary for its intended use. The cost of a contributed tangible capital asset, including a tangible capital asset in lieu of a developer charge, is considered to be equal to its fair value at the date of contribution. Capital grants would not be netted against the cost of the related tangible capital asset. The cost of a leased tangible capital asset is determined in accordance with Public Sector Guideline PSG-2 Leased Tangible Capital Assets. (p.100)

The term "directly attributable" is the key to determining whether a cost can be allocated to a tangible capital asset. For example, the salary, wages and benefits of the staff of a design department that are directly related to completing engineering drawings for a constructed asset could

be allocated to the gross cost of that asset. Allocation of a portion of fixed costs (e.g. occupancy costs or general administrative overheads associated with a City Engineer's office, etc) is not generally considered a directly attributable cost. (p.18)

**Direct costs** are incremental costs incurred by a local government for the acquisition, construction or development of a tangible capital asset. Direct costs would not have been incurred other than to acquire, construct or develop the tangible capital asset. For example, directly related employee salary and benefits, materials and supplies, equipment, temporary site buildings, legal and other professional fees, etc., could be considered direct costs. (p.100)

**Disposals** of tangible capital assets in the accounting period may occur by sale, trade-in, destruction, loss or abandonment. Such disposals represent a reduction in a local government's investment in tangible capital assets. When a tangible capital asset is disposed of, the cost and accumulated amortization are removed from the accounts. Any difference between net proceeds and the carrying amount of the asset is accounted for as a revenue or expense in the statement of operations. The value given for a trade-in is the net proceeds on disposal. (pp.21 - 22)

**Expenses**, including losses, are decreases in economic resources, either by way of outflows or reductions of assets or incurrence of liabilities, resulting from the operations, transactions and events of the accounting period. Expenses include transfer payments due where no value is received directly in return. Expenses include the cost of economic resources consumed in, and identifiable with, the operations of the accounting period. For example, the cost of tangible capital assets is amortized to expenses as the assets are used in delivering local government programs. Expenses do not include debt repayments or transfers to other local governmental units in a local government reporting entity. (p.100)

**Fair value** is the value of an asset based on the price that would be agreed on in an open and unrestricted market between fully informed, knowledgeable and willing parties dealing at arms length without constraint. The benefits of using fair values for assets are the same as using replacement value. There may not be an active market for certain tangible capital assets, however, making the application of fair value difficult. Without an active market, surrogate methods to determine fair values increases the extent of judgment required in preparing financial statements. (p.17)

**Financial assets** are assets that could be used to discharge existing liabilities or finance future operations and are not for consumption in the normal course of operations. Financial assets include cash, investments, accounts receivable, inventory held for resale, etc. (p.101)

**Group assets** are homogenous in terms of their physical characteristics, use and expected useful life. Group assets are amortized using a composite amortization rate based on the average useful life of the different assets in a group. (p.101)

**Historical cost** accounting is objective and reliable because it is based on bargained transactions. It avoids the uncertainties of using another measurement basis. Because accounting is "transaction based," the primary measurement for both assets and liabilities is the value at the time they were acquired, developed or constructed. (p.17)

**Indirect costs** are costs incurred for a common or joint purpose and, therefore, can not be identified readily and specifically with an activity related to the acquisition, construction or development of a tangible capital asset. For example, executive management, occupancy costs for general administrative buildings, corporate services (accounting, payroll, legal, technology, etc.), general local government, etc., would be considered indirect costs. (pp.101)

**Liabilities** are present obligations of a local government to others arising from past transactions or events, the settlement of which is expected to result in the future sacrifice of economic benefits. Liabilities have three essential characteristics:

- a) they embody a duty or responsibility to others, leaving a local government little or no discretion to avoid settlement of the obligation;
- b) the duty or responsibility to others entails settlement by future transfer or use of assets, provision of goods or services, or other form of economic settlement at a specified or determinable date, on occurrence of a specified event, or on demand; and
- c) the transactions or events obligating the local government have already occurred. (pp.101)

**Non-financial assets** include tangible capital assets and other assets such as prepaid expenses and inventories of supplies. Non-financial assets are acquired, constructed or developed assets that are normally employed to deliver local government services, may be consumed in the normal course of operations and are not for sale in the normal course of operations. (pp.102)

**Planned Maintenance and Renewal expenditures** must be taken into account when estimating the useful life of an asset. This means that a local government's repair and maintenance policy can affect the useful life of an asset. Some assets may be poorly maintained or maintenance may be deferred indefinitely because of budgetary constraints. To last its estimated useful life, a tangible capital asset, particularly a long-lived asset such as a road, can require ongoing maintenance and periodic minor and major renewal expenditures. In the

case of a long-lived asset, it is assumed that a single asset basis is used to record the asset for illustrative purposes. The effects would be similar if a component approach were used. (p.24)

**Replacement cost** measures the value of a tangible capital asset at the current cost of replacing the asset. Such costs would reflect alternative uses for assets and are the current economic costs of obtaining similar service potential. The advantage claimed for accounting on a replacement cost basis is that it provides a realistic and understandable value for reported assets. This would be particularly true for long-lived tangible capital assets as the related charge to operations for amortization would have a current value corresponding to the values of other items (such as revenues) in the operating statement. Some view it as particularly useful for setting funding aside for the eventual replacement of the asset. (p.17)

**Revenues**, including gains, can arise from: taxation; the sale of goods; the rendering of services; the use by others of local government economic resources yielding rent, interest, royalties or dividends; or receipt of contributions such as grants, donations and bequests. Revenues do not include borrowings, such as proceeds from debt issues or transfers from other local governmental units in a local government reporting entity. (p.103)

**Tangible capital assets** are non-financial assets having physical substance that:

- are held for use in the production or supply of goods and services, for rental to others, for administrative purposes or for the development, construction, maintenance or repair of other tangible capital assets;
- have useful economic lives extending beyond an accounting period;
- are to be used on a continuing basis; and
- are not for sale in the ordinary course of operations. (p.103)

**Useful life** is the estimate of either the period over which a local government expects to use a tangible capital asset, or the number of production or similar units that it can obtain from the tangible capital asset. The life of a tangible capital asset may extend beyond its useful life. The life of a tangible capital asset, other than land, is finite, and is normally the shortest of the physical, technological, commercial and legal life. (p.103)

Relevant sources of information for determining asset lives include:

- Discussions with the people responsible for the use and maintenance of assets.
- Useful lives used by other entities and jurisdictions for similar assets (the useful lives of major classes of assets are disclosed in annual reports).

- General guidelines from professional or industry organizations (e.g., professional engineering associations).
- Past records of asset acquisition and disposal.
- Useful lives implicit in the capital allowance rates approved by taxation authorities for income determination. (p.44)

Factors to consider in estimating the useful life of tangible capital assets include:

- Similar assets may differ substantially in quality and, hence, in their useful lives, because of differences in materials, design and workmanship. For example, an asphalt road will not have the same useful life as a concrete road. Likewise, the depth of the material used for paving purposes, as well as the quality of the underlying base, will also affect the useful life of a road.
- The useful life of a given type of capital asset may vary significantly depending on its intended use. Thus, the life of a motor vehicle used in the public safety function may differ from the life of the same type of vehicle used in the parks and recreation function.
- Climatic differences among geographic locations can have an important impact on the useful lives of capital assets. For instance, the useful life of a road subject to extremes in temperature is likely to be different from that of a similar road located in a more temperate climate.
- Regulatory obsolescence may shorten the service life of some capital assets used in highly regulated activities (e.g., utilities). (pp.44)

**Write-down** is a reduction in the cost of a tangible capital asset to reflect the decline in the asset's value due to a permanent impairment.